

# The ARCHITECTURAL FORUM

VOLUME XXXIX

NOVEMBER 1923

NUMBER 5

## Good Architecture, a Modern Hotel Requisite

By JOHN McENTEE BOWMAN

*President, Bowman Hotels Company*

TODAY, as in the days of wayside inns from which our great business has grown, the basic functions of the hotel are to provide comfortable shelter, good food and atmosphere. Any well constructed building will provide adequate shelter; good management bears the responsibility of food and service; but for atmosphere—that intangible contribution to the well being and satisfaction of hotel guests—we must look primarily to the architect.

Apart from his direct contribution of knowledge in respect to planning and equipment, the highest talent of the designer is called upon today in increasing measure to create hotel exteriors and interiors which attract and hold interest, establish correct impressions, and create memories which insure recurring patronage and recommendation.

Good architecture possesses the inherent faculty of moulding public taste. It supplies a setting which unconsciously appeals to all within its influence. Applied specifically, and assuming good service, it is usually architecture which primarily influences the choice of a hotel, a dining room, a lounge or a ball room.

Architecture presupposes conditions. For the main dining room of a hotel it suggests comfortable formality—dining in company with a lady—a harmony of form and color without distraction. How different again is the architecture of the grill—a man's room in every sense, reminiscent of days when men traveled the highways on venture bent—trade or travel or war. Here is the atmosphere of jovial masculine companionship—low ceilings and sturdy walls, rugged floors and picturesque, comfortable furniture.

There are also the essentially practical phases of good architectural design which often contribute strongly to the development of the hotel project during its early stages. The sketch plans provided by the architect, with interesting perspective views of exterior and interiors, usually form an important exhibit to accompany mortgage applications, bond offerings and lease negotiations. Architecture in this sense becomes one of the few forms of tangible pre-

vision, and as such constitutes an invaluable adjunct during the stages of promotion and preliminary negotiations covering a highly important business project in which millions of dollars may be involved for investment purposes.

Aside from the elements of design, the hotel owner looks to the architect to assume the highly important responsibility of selecting structural materials and equipment and establishing rigid specifications to be carried out under his supervision. Only through dependable service of this nature is it possible to put into actual operation the complicated structure of a hotel which must combine artistic merit with a high degree of utility. Service demands as interpreted by the hotel owner and management must be translated into physical existence on a basis of economy consistent with the type of hotel service required for the individual project. Broad knowledge of the merits and deficiencies of all classes of building materials and equipment is required. For the hotel owner it is not a question of buying the cheapest available materials and equipment. First cost is important, but after all it is but one factor in an equation involving also the qualifications of long and satisfactory service to offset structural depreciation and costly replacements. This, too, is an important contribution which architecture makes to the hotel.

Under the daily pressure of service organization and management our appreciation of good architectural design may become as subconscious as its impression upon hotel patrons. Remove it, and its lack is felt immediately.

From the very inception of the hotel project to the development of its most recent innovation an almost primary demand is made upon architecture. Fine motor cars stop at fine entrances; social functions need impressive settings; discrimination calls for good taste. In varying degrees the modern hotel demands atmosphere which fundamentally is an appeal to the senses. Color and texture, mass and proportion skillfully disposed in a series of connotations,—this is architecture, and the true background without which the finest service would be little appreciated by the American public.



# Service Analysis, the Key to Successful Planning

By E. M. STATLER

President of The Statler Hotels Company

THE heading of this editorial indicates a truism in hotel planning expressed by all, adopted by many, but accomplished by few. When a hotel project fails, the elements which prevented its success might have been eliminated by a carefully detailed preliminary study. With a passing word we may take for granted the importance of sound financing, correct location and good architecture; we may assume that in any analysis the type and general plans of the hotel will meet local requirements and establish a sound business prospectus. There is one test, however, which applies equally to the preliminary analysis of any hotel project, to the finished plans of the hotel, to the completed building and to its administration—it is the *test of guest service!*

In any hotel scheme the most important feature is rooms, and *room service* becomes of paramount interest in planning. Next in importance, and often almost equal in importance, is restaurant service. These elements of service, with their background of efficient planning, are the primary test factors in considering a hotel plan.

"Room service" is a broad term which covers not only meeting the requirements of guests but also the care which the rooms themselves require from employees of the hotel in order that they may be kept comfortable and clean without inconvenience or unnecessary contact with guests. The development of this type of service in the course of planning requires much thought and consideration in order that rooms may be easily accessible to passenger elevators and to service elevators. "Restaurant service" is highly important from the guests' viewpoint, and no consideration, even that of the provision of sub-rental space or concessions, should in any way detract from the accessibility and attractiveness of space given over to this purpose. In this connection a study must be made of kitchen and service department accessibility and equipment to promote speed in service.

Every hotel requires a different solution of these important service problems, depending upon the city, the location of the site and the dimensions of the building lot, as well as upon the character of the neighborhood. The location of the building site in any city is one of the most important points for consideration, and in turn it will determine the general arrangement of ground floor space and the exact purposes to which these space allotments will be devoted. Each division must then be studied, not only as to plan and approach but also as to its relative importance to the general first floor plan, its convenient inter-relationship with other departments, its service value to the guests, and its productive value from the investment viewpoint. The

typical room floor must receive most careful consideration, based primarily on the requirements of the guest and service to him, realizing at the same time that wherever service is made easier for the employe the guest will benefit. In this manner, part by part, from sub-cellar to roof, a plan must be studied, thinking always in terms of those who will pay for this hotel service and humanizing every line and angle with the realization that one day this building will be an actual, operating machine.

This leads to another thought which should constitute an actual test of any hotel plan. To what extent is it necessarily complex? The trend of the day is toward large hotels, and even as one is amazed to see beautiful, vast cathedral buildings looming up above the small, cluttering villages of southern France, so is it amazing to encounter the sizeable hotels that are beginning to appear even in smaller cities and towns and the vast buildings which are becoming landmarks in the greater cities. With this tendency toward size there is a natural trend toward complexity from the viewpoints of planning, construction, equipment and administration. It is obvious, however, that the various parts of a large complex may be easily unbalanced in size and capacity. All space devoted to service activities is subject to a fine analysis which will limit its physical size without danger of establishing too small a capacity.

In too many instances the planning of hotels is carried out without consideration of the human element as represented by employes. The distances between kitchens and dining rooms are too great or broken up by stairs; service elevators are inconveniently arranged, and the help's quarters are located in inadvisable sections of the building, subject to difficult control by the housekeepers. This and many similar elements make for complexity, and complexity in plan, equipment and *service requirements* necessitates a greater investment, higher structural and maintenance cost, and a greater proportionate cost of the service rendered to guests.

Perhaps this question of detailed preliminary analysis may be boiled down to the term "plain common sense," but it must be the common sense of experience—and, consequently, the services required in establishing the proper preliminary analysis as well as in developing the finished structure include not only the skill and art of the architect but the detailed technical advice of engineers and, above all, the supervision of a practical hotel man equipped with a thorough knowledge of the many important and incidental problems which develop daily in each department. The architect can help the hotel man—the hotel man can help the architect—but alone, they both tread on dangerous ground.



# Popular Features that Sell Hotel Service

By J. LESLIE KINCAID

Vice-president, United Hotels Co.

HOTEL operation in America has developed to such a point that operators of modern hotels, having run the known gamut of mechanical perfection, are now obliged to seek distinction in that field which in other days, as now, was open to even the humblest innkeeper—the most important as well as the oldest and the best “selling feature” of all—that is *personal service*. In fact, so successfully have hotel operators met the demands of their public for conveniences of a mechanical character, that our company stands quite ready to offer a prize to any traveler who will tell us of something that has been forgotten or that can be still further perfected. We have our valet service, our various cigar and newsstands, and bookstalls where the most recent fiction may be obtained; we have our theater ticket agencies, our elaborate barber shops, our hotel stenographers, and about everything else that will serve personal convenience.

As a matter of fact, in a well planned, modern hotel, I should say that practically every need of a guest is now provided for within the confines of the hotel building. I am thinking particularly of the mercantile stores, which, in a building like our new Hotel Roosevelt, in New York, will occupy the ground floor of the four sides of a city block. We are planning to make each of these stores distinctive and exclusive, each catering to some specific need of the hotel guest, without duplication of appeal.

Of course there are other instances I might cite as indicating the desire of hotel men completely to serve the public—for example, that chapel which Mr. Bowman has so happily established at the Biltmore. In short, everything that conduces to the comfort and well-being of a guest is being done to “sell” hotel service. If you can develop a specialty in your restaurant or coffee room,—as the Parker House of Boston did with its rolls, as the New York Yacht Club does with its creamed codfish, as the King Edward does with its creamed onion soup, as the Mount Royal, at Montreal, does with its soufflé of lobster,—then you are “selling” special service, and the more and better specialties you have, the more attractive your service.

In a general way, the basic services provided by a hotel are the giving of food and shelter, and food here, of course, is meant to include drink, just as shelter connotes good sleeping accommodations. Naturally, where nature has set aside one-third of each 24 hours for sleeping, the hotel man gives first consideration to that factor. As to food, there are so many ramifications that it would be footless to discuss them in detail. Let us say, in a word, that both factors are well taken care of. Anything added may be called “extras,” and they are myriad. Many

of them have become so firmly established that though once looked upon as luxuries they are now necessities in any well conducted hotel.

Take, for one example, the telephone. The wire to the guest room is the link between the occupant and the outside world. No matter where he lives, through the hotel telephone and telegraph facilities he can be “at home.” A modern hotel without a telephone in each room would simply not be—modern. We are now even getting direct radio service in guest rooms, with radiolite door knobs and push-buttons, double entrance doors for the delivery of packages without invading the privacy of the room, free bouquets and baskets of fruit.

Then there is the tendency of the modern hotel to seek locations convenient to the theater district and to the railroads. The Roosevelt, for example, is being built partly across the terminal tracks of the Grand Central, while our four million dollar Olympic Hotel in Seattle, is being built around three sides of a modern theater. Also, the hotel itself is becoming more and more a popular rendezvous. “Meet me at the fountain” has given way to “Meet me in the lobby.”

But, after all, real service in a hotel is *personal* service, just as it was centuries ago. You cannot patent good manners or copyright courtesy; they are the priceless heritage of the hotel man, as possible to the small town boarding-house keeper, as to the lord of a palatial metropolitan hostelry, and you will usually find the boarding-house keeper more alert.

English inns offer a fine example of personal service. They are today as they have been for centuries. Our Mr. Rockwell, who recently returned from a motor tour of the English country districts, marveled at the perfection of personal service maintained in the ordinary wayside inn. In this country it is much more of a problem to supply intelligent hotel help of the proper type. The movement fostered by the American Hotel Association to train hotel executives at Cornell and other universities is in line with the need of developing specialists in hotel operation. But even this does not give the high class of personal service which so allures the rule-ridden American traveler in English and continental cities. A pleasant “good night” from the elevator man at one o'clock in the morning, especially if he is smart enough to be able to mention the guest's name, is service the value of which cannot be reckoned in dollars and cents, but is illustrative of the best service of all.

How can it be done? How can the principle of “personal service,” so essential and desirable in a small establishment, be applied to the large hotel of 2,000 guests? Well, it can be done, and it will be done!





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END OF LOBBY  
LOS ANGELES-BILTMORE HOTEL, LOS ANGELES  
SCHULTZE & WEAVER, ARCHITECTS

*The Architectural Forum*



# The Architecture of the Modern Hotel

By LEONARD SCHULTZE

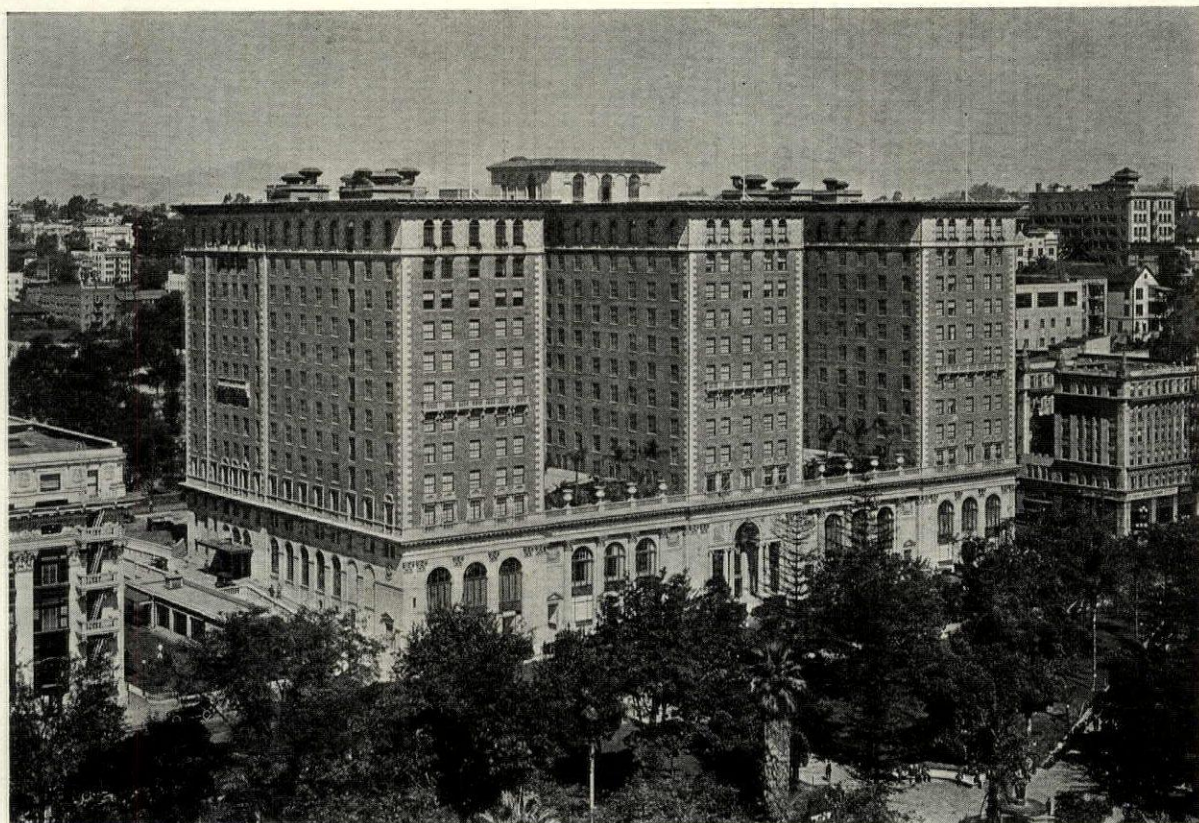
*Schultze & Weaver, Architects, New York*

THE modern hotel from the standpoint of architectural design presents to the architect for solution the same problems that are involved in the design of any other structure of considerable size. The type of hotel having been decided upon, the building must then be so planned that it will adequately provide the necessary guest and public rooms, together with the attendant facilities that are so absolutely necessary to the successful operation of the hotel when erected.

The essential element in the planning is that of the typical guest room floor which must be so arranged, in keeping with the character of the proposed hotel, that the best type of bedroom, bathroom, etc., will be secured. Through skillful planning the bedrooms must be such that the maximum exposures to sunlight and the prevailing winds will be afforded. The location of the elevators, that they may most centrally serve the various rooms, is of importance, as are the locations of stairways, linen closets, slop sink closets and floor clerks' stations, when the latter are to be provided. These and the many other essential elements that make for successful and convenient operation must be carefully considered and provided to insure ultimate success of the operation from all angles.

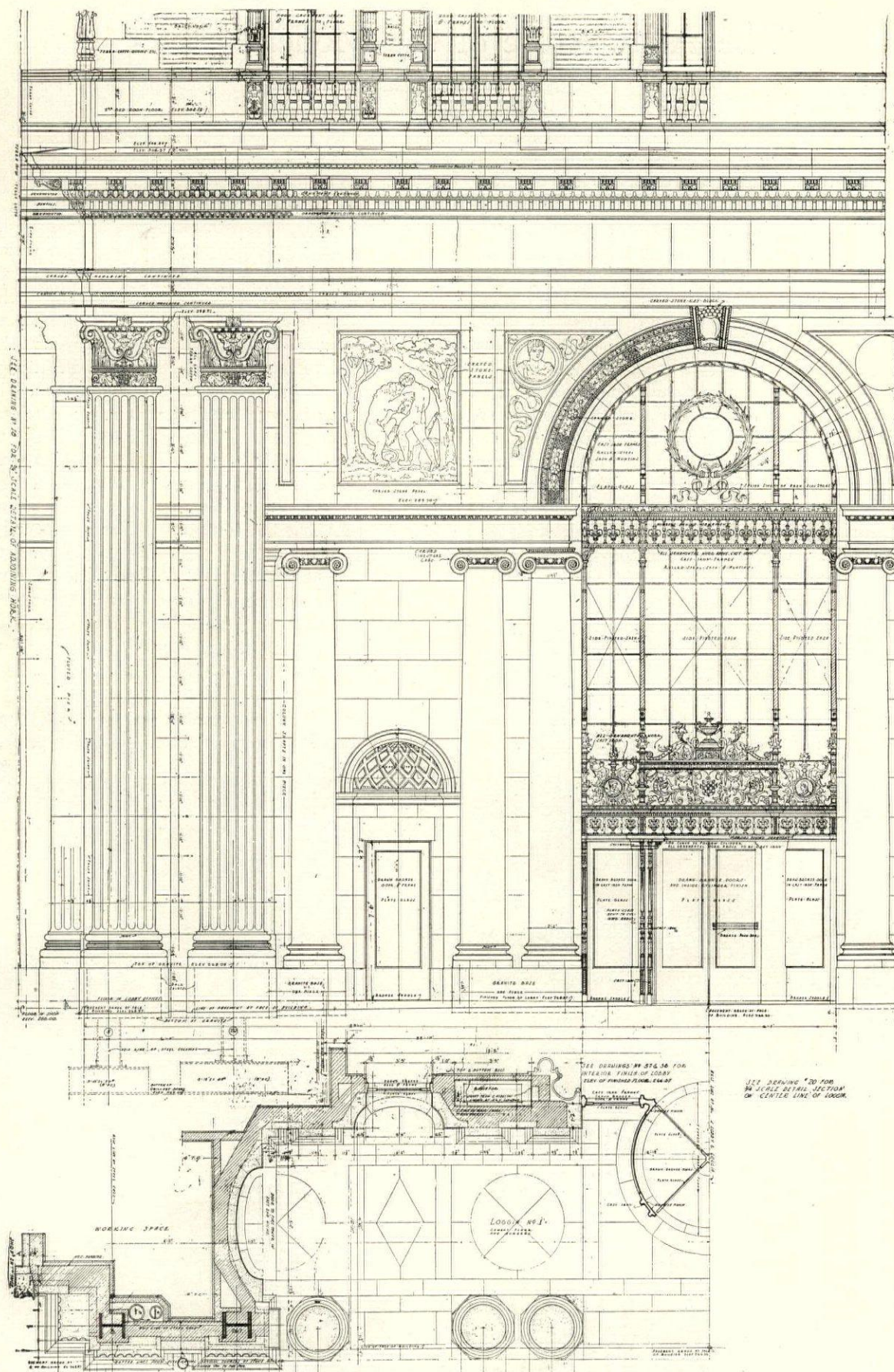
The arrangement of the offices and the public rooms, such as dining rooms, grill rooms, ball rooms and the other public features, should be such as to harmonize in layout with the plan of the typical bedroom floor and afford to the patrons the utmost in accessibility and convenience. The kitchens and service facilities, as well as the employes' locker rooms, toilets, etc., should be planned and located so as to most easily serve the various rooms they are intended to provide for. Considerable thought and attention must be given to the location of the service and power plants, the delivery entrances and the arrangement of delivery spaces to the various elements of the plan. These are of as much importance to the successful operation of a hotel as the arrangement of the guest and public rooms. It may seem that the solution of these problems as enumerated have little if anything to do with the character of the architectural design of the building; however, the successful hotel, insofar as its exterior is concerned, can be nothing more than a true expression of the various elements of the plan and the component parts of the building that go to make up that plan.

The dimensions and proportions of the lot upon which a hotel is to be erected will govern in part the



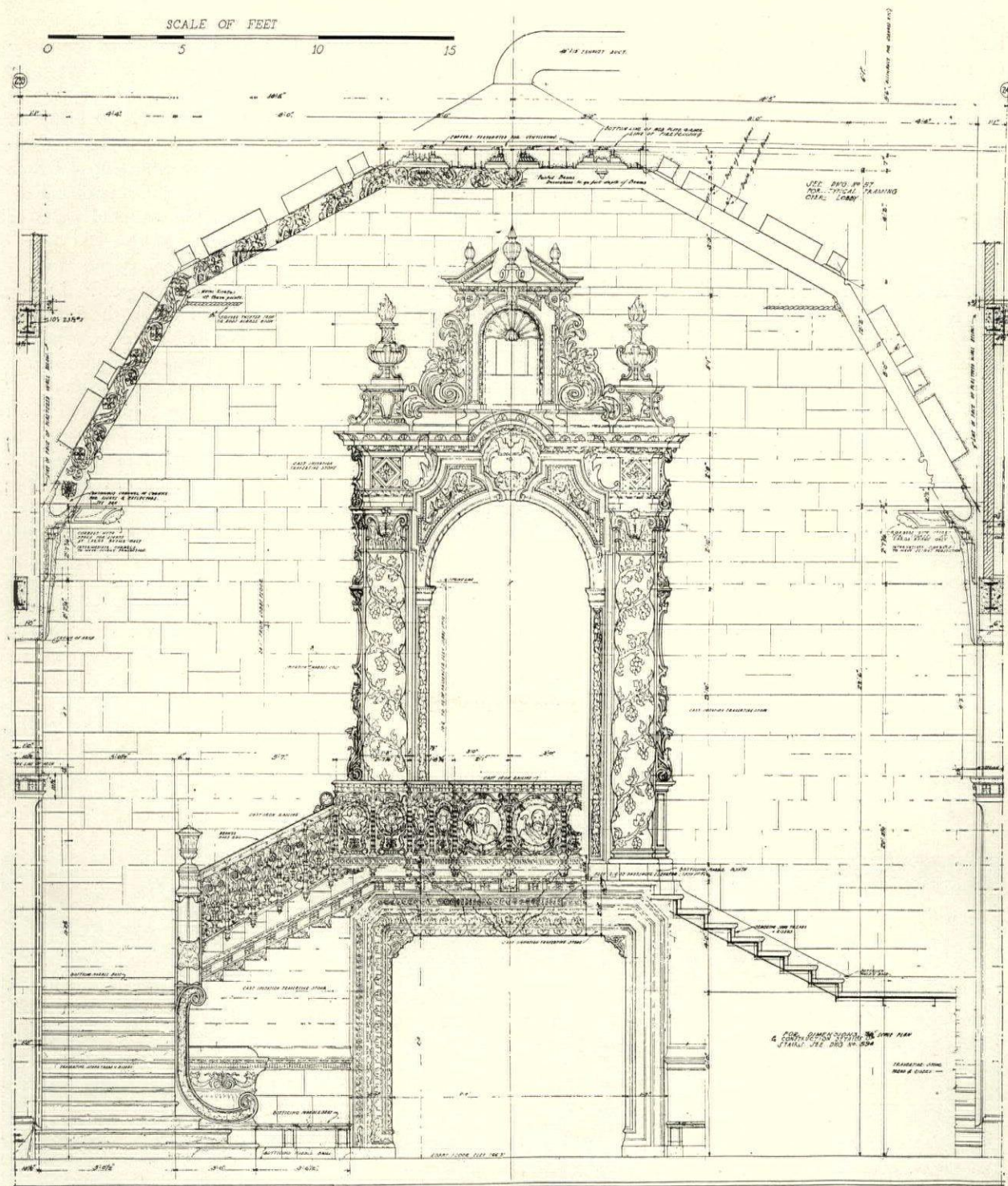
General View of Los Angeles-Biltmore Hotel, Los Angeles  
*Schultze & Weaver, Architects*





DETAIL OF MAIN ENTRANCE  
LOS ANGELES-BILTMORE HOTEL, LOS ANGELES  
SCHULTZE & WEAVER, ARCHITECTS





THE scheme of the Los Angeles-Biltmore interior is built around the long gallery which extends through the entire length of the building. From it all the public rooms are reached through monumental doorways. The lobby, a detail of which is shown here, occupies the first three floors of the center wing. It is a distinctive expression of Spanish renaissance; the focal points of decoration are the marvelously elaborate staircase with richly wrought balustrade and the vigorous beamed ceiling, accented

by antique lanterns of heroic size which appear to advantage in contrast with the simple travertine walls of the lower part of the room. The main dining room is arranged with two rows of large columns of porous travertine supporting a richly decorated beamed ceiling. The columns and walls are non-resonant, which produces perfect sound-deadening properties. The room is therefore free from the conversational hum so noticeable in rooms paneled in closer grained stones.

DETAIL AT END OF LOBBY  
LOS ANGELES-BILTMORE HOTEL, LOS ANGELES  
SCHULTZE & WEAVER, ARCHITECTS



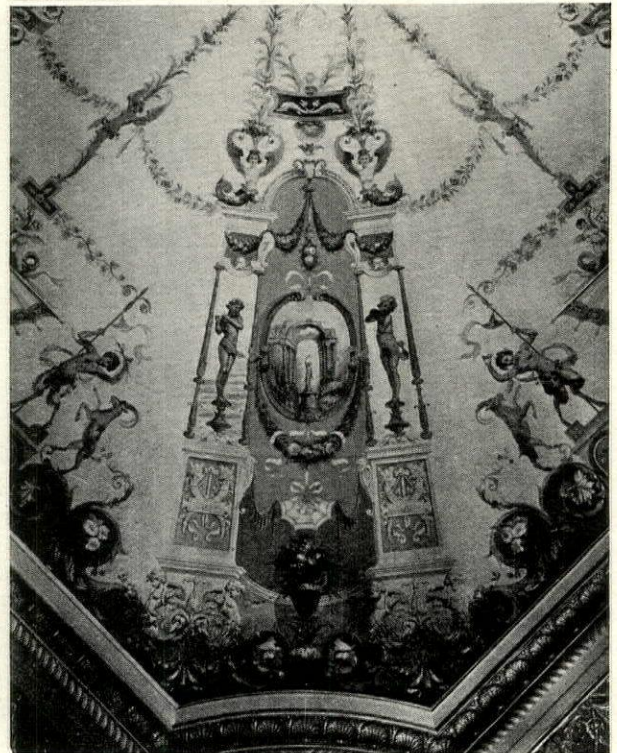
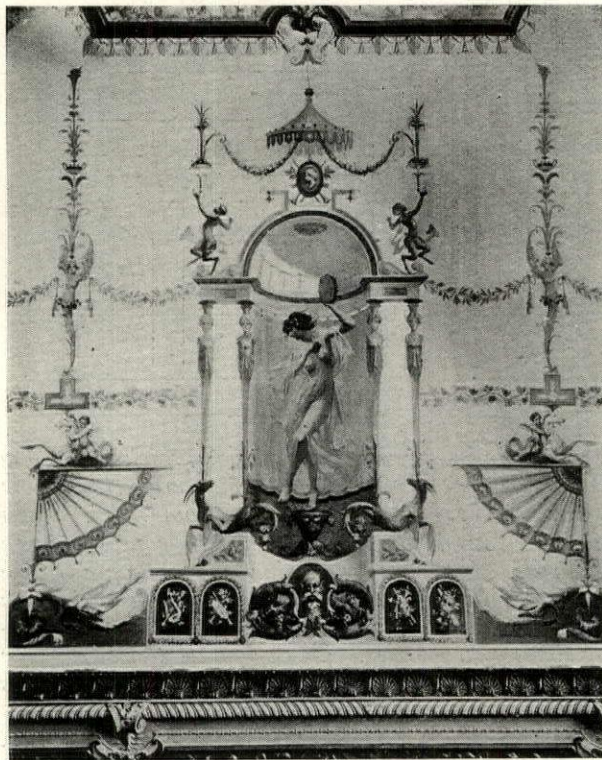
arrangement of the rooms so that the most economical use of it may be obtained. This will affect the character of the outline of the building and determine the general mass of the structure. The climatic conditions also have their bearing on the architectural design. A hotel building for a southern city or a resort calls for an entirely different plan from that of a hotel which is to be built in a congested northern city. A hotel to be constructed in the northern portion of the country where cooler climatic conditions prevail will not require the same amount of court area as one built in a southern city or a resort.

The best designed hotels in this country are those which distinctly express in their exteriors the plans of the buildings behind the outer walls. They are the hotels in which the architect has not endeavored definitely to employ a style of architecture which is not symbolical of the purposes for which the hotel is to be utilized. A hotel of a purely commercial character in a business city with its business surroundings requires that the design should partake of these elements. If, however, the hotel is in a summer or winter resort and it is to be used more or less as a social center, a freedom of treatment is permitted, which is not true of the first mentioned type.

In addition to providing in the planning for the various spaces and necessary facilities to care most adequately for the purposes for which the building is intended, the architect must always bear in mind the ultimate cost of the structure. If the appointments and decorations are too expensive and the

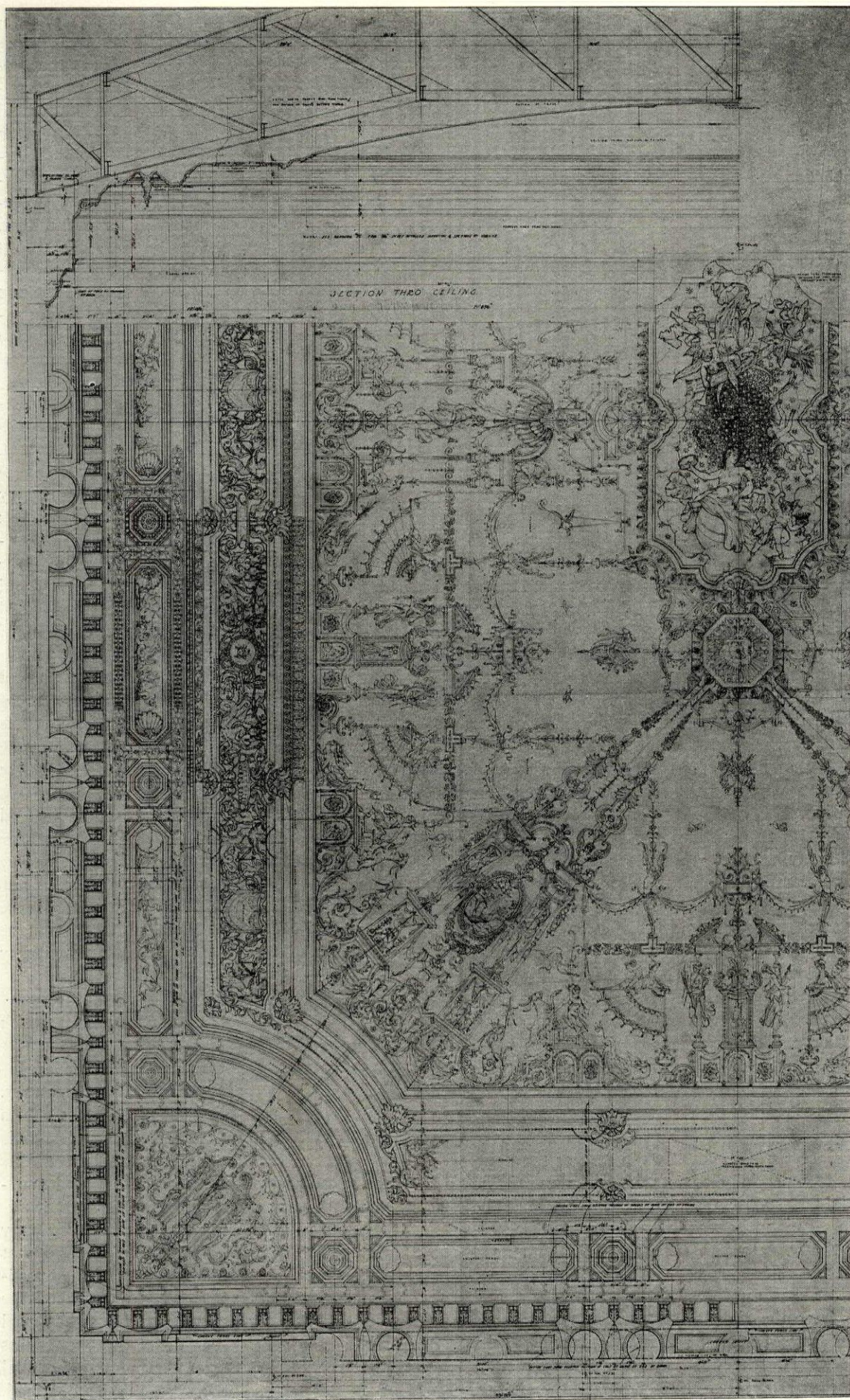
volume of cubic contents too great, it is sure to prove a financial burden to its operators and ultimately be classed among the failures. There are numerous hotels in this country which have cost so much money that they cannot be made to bring an adequate (if any) financial return to those who invested in the ventures. There are others upon which too little money has been spent, which made necessary the omission of many of the essential parts of such a building. In consequence of this the operators are unable to give to their patrons the kind of service they have every right to expect. In the course of time competition will cause the building of other structures of a like, but better, character. These will have all of the necessary appointments provided for. The hotels without the adequate facilities will further suffer and be confronted with an extensive and expensive alteration program, out of proportion to the original cost of providing the facilities that should have been included when the hotels were built.

The various municipalities and states have adopted zoning, building and hotel laws. It is therefore virtually impossible to determine a universal type of building, either in exterior architecture or in plan, that will fit any two localities. In Boston the limit of height of a building has only recently been raised to 155 feet; in Los Angeles it is limited to 150 feet, while San Francisco places no limit. Chicago allows a maximum height of 260 feet. The zoning law of New York creates a problem entirely different from that in any of the other cities mentioned.



Details of Panels, Painted Ball Room Ceiling, Los Angeles-Biltmore Hotel  
Schultze & Weaver, Architects





DESIGN FOR PAINTED CEILING OF BALL ROOM, LOS ANGELES-BILTMORE HOTEL  
SCHULTZE & WEAVER, ARCHITECTS



In consequence of various restrictions as to height, some of which have been set forth together with other regulations which vary throughout the country, there is hardly any particular type or style of architecture which lends itself to a general solution of the hotel problem. The architect is governed by the conditions of the city in which the building is to be erected, and must adopt a style or period of architecture that will best fit these conditions, which can be used, however, in no more than a decorative sense to cover the bones of the structure. It is impossible to say that Italian renaissance, Gothic, Louis XVI or any other period of architecture is best

adapted for any particular type of hotel. The exterior of any American steel-frame building is so vastly different from that of the buildings of the older countries where established styles of architecture prevail that no matter what particular type of architecture is employed the result will be only one of decoration.

The fenestration of a building should not be determined solely with the idea of securing the most pleasing appearance from the exterior. It should be so arranged that it will afford the best light and most air to the rooms that are to be taken care of. In most of the building laws of the cities of this country at present provision is made for a minimum window surface area which each room must have. This in general depends upon the number of square feet or other unit of measure contained in the room and will at times tie the hands of and restrict the architect in his selection and force him to adopt a type or size of window which may not always be to his liking.

If there are, as is frequently the case at the present time, commercial elements in the plan of the hotel building, such as shops, etc., they must be treated in a practical manner so that it will be possible for the operators to obtain sufficient financial returns in direct or greater proportion to the space set aside for such purposes. This the investors and operators have the right to expect.

The designer of a modern hotel is in exactly the same position, and has the same problems to solve, as the designer of any other commercial building.



Corner of Ball Room, Los Angeles-Biltmore Hotel,  
Los Angeles

It is necessary to subordinate and at times sacrifice what the designer frequently considers his individual tastes and desires in order to provide adequately for the commercial uses and requirements of the building. He has no right to indulge his fancy in over-decoration, or in the use of more expensive materials for decoration than may be deemed essential—necessary to make the building a safe commercial investment. Hotels are planned and erected, except in a few and rare cases, with the primary idea of making money; in addition they are expected to supply the needs of the public, and at the same time afford the greatest number of conveniences possible.

Although tied down with many restrictions and with the commercial aspect always in mind, there is no reason why in designing buildings of this character great diversity of treatment cannot be obtained. No two structures need be, nor are they likely to be, the same, as seldom if ever are two plots upon which such buildings are to be erected exactly the same in size and contour. Very few hotel operators would require or wish the same type of hostelry everywhere. The problem of the commercial hotel is so different from that of the hotel devoted to social and residential patronage that the two must of necessity be treated in entirely different ways, both as to plan and design.

Roofs which are simply decorative features and serve no purpose occupy area and cost money, which could be utilized to provide additional conveniences or at times better the construction. These are as anomalous on hotel buildings as on other structures. Decoration serving no purpose is as out of place in a hotel as anywhere else. Simplicity of design is the first essential, and frequently the best effects have been obtained by the utilization of good materials and a minimum of ornament.

In the interior public rooms more latitude may be allowed. The public has come to demand that hotel rooms should be good. The taste of the traveling public has improved and has now reached the point where it knows whether the architect has used good or bad judgment. It is demanding, as far as it can, that the design and appointments of a hotel shall be as high in standard as can be obtained.



# Architectural Design for Hotel Interiors

By WALTER HOPKINS  
*of Warren & Wetmore, Architects, New York*

PERHAPS the most important, and certainly the most difficult, of all the problems facing the architect of that complex structure known as the modern hotel are the arrangement, design and decoration of what may be called the public rooms. The difficulty lies chiefly in the fact that the arrangement of the ground floor must be dictated in a very great degree by the position of the light courts, elevators, stairways and columns of the bedroom floors above.

Having determined the plan of the lower floor or floors and, in a general way, the size, form and proportions of the various rooms, the interesting and important question of their proper design and decoration presents itself. The architect of today, if his building be in or near one of the larger cities, has at his disposal an almost unlimited variety of materials from which to choose. Domestic and imported stones and marbles, tiles, faience, terra cotta and terrazzo in almost every conceivable color are to be had; and the vast field of modeled or plain plaster work may be made to play an important part. Walls, wainscoting and even ceilings of paneled woodwork in any of the many domestic or foreign woods, if properly designed and finished, may give to the smaller rooms a certain inviting warmth; cast and wrought iron and bronze, judiciously used and skillfully executed and colored, will give an attractive occasional accent; and lastly, but perhaps of greater scope than any of the other mediums, are the limitless possibilities offered in the domain of painted decoration and ornament.

With all this wealth of material at hand, the troubles of the designer begin. For it will be more than wasted effort if his rooms upon their completion do not afford a suitable environment for the particular class or type of persons who form the hotel's clientele, and perhaps of all the problems to be solved the most difficult is the intangible but fundamental problem of securing the proper degree of simplicity or of elaboration which will appeal most strongly to the majority of his public.

If the entire building has been conceived in one of the orthodox "styles" and it is the intention to have the public rooms designed and furnished in the same "period," the imagination and individuality of the designer will be held rather strongly in check,—which may or may not be an excellent thing, as the case may be. But in any event, the great value of contrast should not be lost sight of, and especially in large hotels with many public rooms does the danger of monotony become imminent. By contrast is not meant incongruity. By varying the materials used and the shapes and proportions of the rooms, schemes of the decoration, hangings and furniture,

a harmonious effect can be obtained for the ensemble and yet each of the rooms be given a distinct individuality. If the grades of the streets or property permit, the interest of the entire ground floor as a whole will also be much enhanced by changes in floor levels and by the adroit use of steps and terraces.

In approaching the various rooms in the order of their importance, the lobby should perhaps be placed first. Here it is that the incoming guest receives that first impression (so important to the management) as to the likelihood of his sojourn's being pleasant or the reverse. The part the lobby plays in the life of the hotel is of course dependent entirely upon the character of the hotel itself. Broadly speaking, the lobby receives the hardest usage of all the public rooms and is the most difficult to keep in order, and therefore its floors and walls to a certain height should be of a material easily cleaned. If the appropriation will permit, a floor of Tennessee marble, as in the Hotel Belmont, has been found to be the most durable, but terrazzo in colors and hard, vitreous tile may be used effectively and at considerable reduction in cost.

The treatment of the walls will depend entirely upon the whim of the designer and the amount of money that he has to spend. Travertine wainscot with rough plaster above and a painted wooden ceiling have been used with good effect in the lobby of the Commodore, while imitation marble and a glass ceiling provide an impressive lobby at the Hotel Pennsylvania. As the lobby is in many cases placed by necessity in the center of the hotel, and therefore must depend almost entirely on artificial light, the method of lighting is most important and should be given considerable study. If the lobby is large and has a gallery on one or more sides it will be found advisable to light it without ceiling chandeliers in order that guests sitting on the balcony may not be annoyed by light from chandeliers at or below the level of their eyes. Light may be thrown on the ceiling from reflectors placed either on the walls or in high standards properly placed about the room or projected through glass ceiling lights. The last method is the less economical.

To sum up the lobby in a very general way, it would appear to be the most difficult room into which to inject any degree of charm. The office desk, the news stand, porter's desk, public telephone and telegraph offices and the gallery that is almost always necessary, all add to the difficulties of the designer, and it is only by the skillful use of materials of harmonious colors and textures that a satisfying result can be obtained.

Following the lobby in importance, and usually





The very finely proportioned main restaurant of the Ritz Carlton. Its oval form and finely studied detail make it a room of great distinction among the metropolitan hotels of New York. Warren & Wetmore, Architects

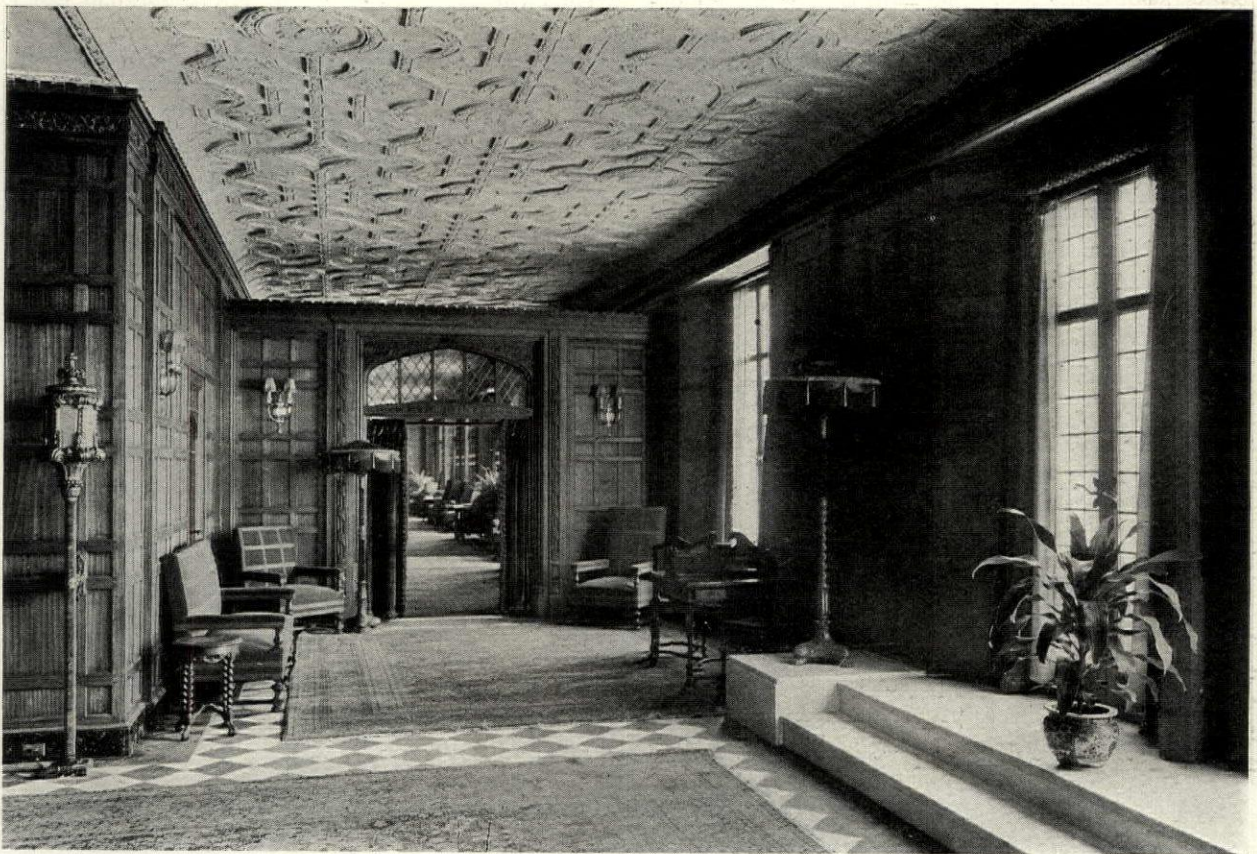


One corner of the restaurant in the Hotel Chatham, a very simple and inexpensive room, relying for its effect, upon its proportions and color scheme. The walls are a light apple green with crimson hangings. The furnishings and carefully considered lighting fixtures make it a pleasing and livable room. Warren & Wetmore, Architects





The imposing staircase leading to the ball room of the Ritz Carlton. This is a fine example of the monumental English staircases of the late eighteenth century. Warren & Wetmore, Architects



Part of the lobby of the Hotel Chatham, looking into the long gallery. The hand-modeled Tudor ceiling, the antique oak wainscoting, and the black and white marbled floors give an atmosphere domestic and livable  
Warren & Wetmore, Architects



adjoining it, is the restaurant, and if the room is inherently good in form, size and proportion, its decoration should not be difficult. It is of course impossible to set forth any rule by which a hotel restaurant may be designed, and the choice of materials is limited only by the size of the appropriation. To cite a few examples of well known and successful rooms, the restaurant of the Ritz Carlton is a fine example of the architecture of the late eighteenth century in England. It is elliptical in form and of fine proportions, and its plain green plaster walls enriched with the gilded mirrors of the period, contrasting with carefully designed columns and entablatures of carved marble and richly detailed and modeled plaster ceiling, give a room of great distinction. On the other hand, the principal restaurant of the Biltmore has its walls in imported marble with pilasters; a finely designed plaster ceiling in low relief has been finished in dull gold and subdued colors, and any feeling of coldness has been eliminated by the use of rich wine-colored hangings and by the profusion of plants and growing flowers, all resulting in a room of unusual dignity. The restaurant of the Commodore has walls of American walnut with painted and inlaid decoration surmounted by a groined, vaulted plaster ceiling elaborately modeled and enriched with color. The main restaurant of the Hotel Pennsylvania has walls of roughly finished plaster with the trim of the arched windows in decorated faience and a very fine ceiling of plaster beams beautifully decorated,—altogether an imposing room, finely designed and executed. In contrast to the rooms just described and still illustrating the range of possible materials and colors is the "Della Robbia" room in the Hotel Vanderbilt. This is a room of great charm, whose walls and columns are in tile of a fine Italian blue embellished with cream-white faience. Large panels painted and decorated in a slightly humorous vein with tropical birds, foliage, fish and flowers give a cheerful and festive air to the room. The ceiling is vaulted in blue and white tile. It is possible to continue to cite successful hotel restaurants in almost every style, material and color scheme from the most elaborate and expensive to the most simple. Delightful effects can be produced with the most inexpensive materials, and with the simplest of designs, if proper care is given to the scale of the decorative elements and the color scheme of the walls, hangings and furniture.

It is the universal custom to make the grill room a less formal room in every respect than the restaurant proper, so that persons less fastidiously attired may feel in a proper environment. The ceiling may well be much lower, and the style, ma-

terials and color scheme more free and informal. If the floor is to be carpeted, cement with a wood carpet strip around the baseboard will of course be proper, but if there is to be dancing in the grill or the carpet removed in summer, a better floor will be necessary. Wide boards of teak or oak pinned together or black terrazzo or marble mosaic with colored tile borders and inserts of brass make attractive floors, as do the vast assortment of tiles of all shapes, sizes and colors. The walls may be of any material, but perhaps wood paneling, if used with taste, may be made to give the greatest warmth, cheerfulness and informality. The ceiling, if of necessity very low, should not be decorated, and in any event should not be over-burdened with detail.

That grill rooms may advantageously be placed below the first floor and made entirely dependent on artificial light and ventilation is testified to by the success of such rooms as the grills of the Knickerbocker, Ritz Carlton, Waldorf, Vanderbilt, McAlpin and many others, but the lighting and ventilation should be given great attention and if possible made part of the decorative scheme.

If there is to be a ball room, the designer is to be congratulated, for here it is more than in any other room perhaps that he may unfetter his imagination. Again the opportunity for the attractive use of materials and color presents itself, and again the difference between the most modern of hotel ball rooms is very great. For example, the gold ball room of the Biltmore is at the top of the building, with great arched windows on three sides, while the ball room of the Commodore is directly over the lobby and is entirely without outside light, as is also the ball room of the Ritz Carlton. The ball room of the Hotel Pennsylvania is lighted from one side only, and all these are successful rooms.

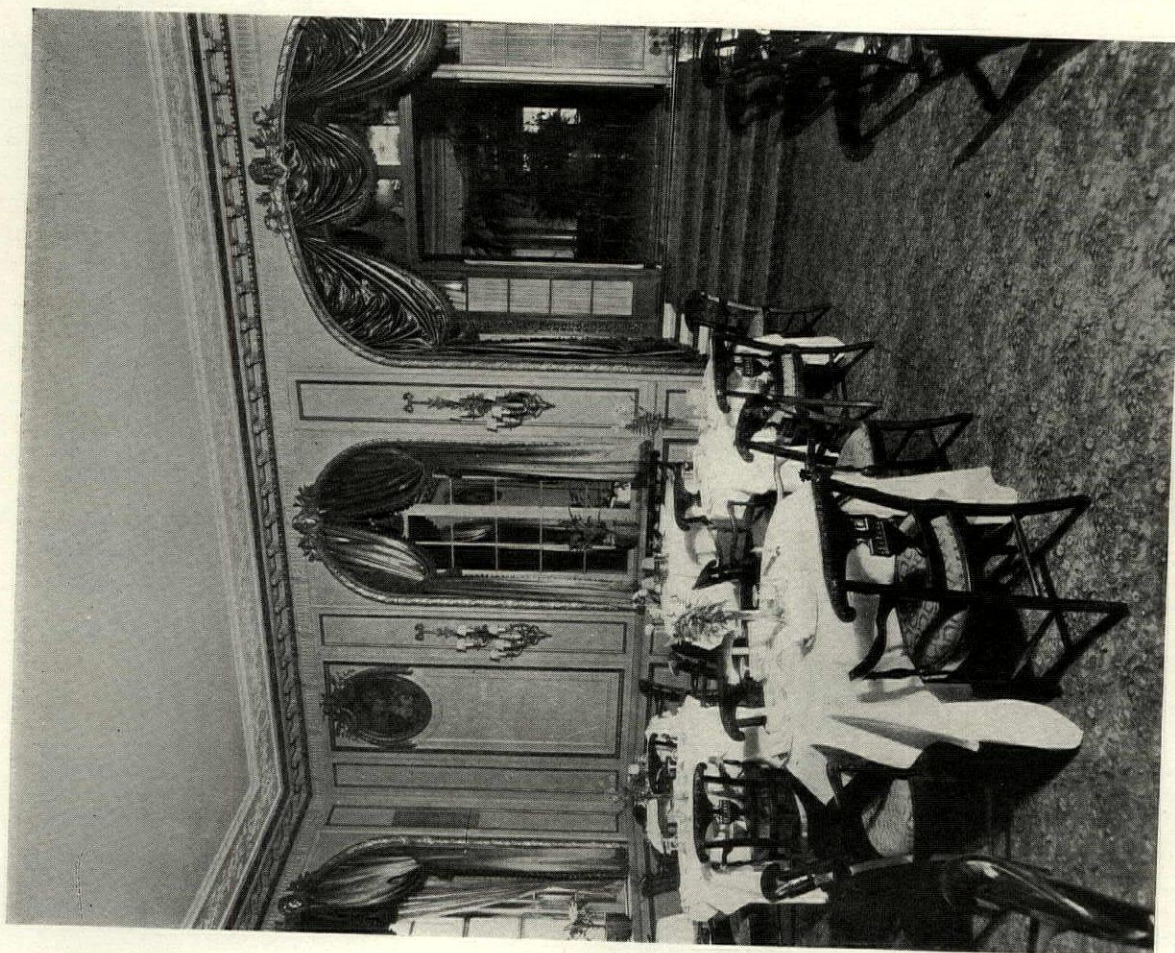
The function of this room has changed greatly in the last few years, and it is now used very largely as a room in which to hold large banquets and public functions generally; but inasmuch as at times the entire floor will be used for dancing, it should be of maple carefully selected and laid. The boxes or gallery, which the management will undoubtedly insist upon having on one or more sides, should if possible be made a part of the entire design, and whatever be the scheme of decoration, it should be used only as a background or setting for the occupants of the room when it is fulfilling its intended mission.

Speaking very broadly, the public rooms of the modern hotel offer vast possibilities and interesting problems to the architect and his collaborators, and not the least of these is the intelligent use of the many allied arts and their various branches and creating a harmonious whole, within the limits of the appropriation at his command.





The palm room, which forms the approach to the principal restaurant of the Ritz Carlton, has walls of stone and a glass ceiling through which the light is thrown. The furniture, palms and large torches and other embellishments give this well known room unusual character. Warren & Wetmore, Architects



The restaurant of the Ambassador has its walls paneled in wood and finished in green and gold. The crimson curtains and the lighting fixtures, together with the painted flowered panels and distinctive chairs and furniture, make this a most successful room. Warren & Wetmore, Architects





The banquet room at the top of the Mount Royal Hotel is arranged for use as a summer dining room; bright hangings arranged tent-fashion above decorative poles produce an air of gaiety at moderate cost  
Ross & Macdonald, Architects



The walls of the main dining room of the Mount Royal Hotel are of warm toned Hauteville marble; wrought iron grilles and lighting fixtures with the decorated ceiling combine to produce great dignity. The raised platform and architecturally framed painting at the end give a focal point of interest to the room  
Ross & Macdonald, Architects



# The Hotel Plan

By W. SYDNEY WAGNER

*Geo. B. Post & Sons, Architects, New York*

**R**EQUIREMENTS for hotels vary greatly with the cities in which they are located and the type of service they aim to render. The largest single group is the commercial hotel, and the elements of a first class building of this type of 500 and more guest rooms' capacity are becoming fairly standard. In developing the general discussion of hotel planning in these pages this class of hotel has therefore been kept in mind.

The conditions to be met in creating hotel service are essentially uniform and may be simply stated. The great majority of guests are travelers "on business"; the average city in which the hotel is located is itself devoted principally to business, and its social requirements are simpler than those of a cosmopolitan city like New York; the number of guests likely to use a hotel as a place of permanent or seasonal residence is small, and there is a lack of good restaurants. Most of these cities aim to attract the numerous trade conventions, club and fraternal gatherings which fill the rooms and lobbies of the hotel to overflowing for a week at scattered intervals, leaving it abruptly to resume a normal existence.

Given these requirements, the hotel must, above all else, be a place where the traveler can obtain shelter and rest; where if he be a merchant or salesman he can display his wares and transact his business with comfort. It must next supply his various wants in dining room and sleeping room service; and if it would avoid being relegated to the ranks of the justly despised "second rate" commercial hotels, it must supply this service in such manner that the guest upon leaving will look forward with pleasure to his next visit. It must endeavor to be both for the residents of the city and for the out-of-town guests the center of the social activities of the town. It should be capable of handling the peak load occasioned by the arrival and stay of a large convention without disturbing the comfort of the other guests. Its service, morale and appointments and the atmosphere of its public lobbies and dining rooms, should be such as will neither offend nor repel the woman guest, nor yet overawe the commercial traveler.

In particular, the commercial hotel will require a great percentage of single rooms and will also require that even where suites of two, three or four rooms are provided, each one of these rooms will be equipped with a bathroom and be so planned that they can be rented either by the suite or as separate rooms. Naturally, the corners and ends of wings are the most desirable locations for these suites. The lobby in a commercial hotel should be of such size as will provide ample lounge and seating space

for commercial travelers, who very often spend much time in this room waiting for appointments and frequently use it for the transaction of business. In a strictly commercial hotel it is a mistake to provide too much formal dining room space. The necessary amount of space should be carefully apportioned between the main dining room and such other dining facilities as the men's grill or cafe and the lunch room or cafeteria. While in a commercial hotel it is not always desirable to compete with other agencies for large social functions, yet the building should have sufficient banquet room and convention facilities to attract to it the various business conventions and the luncheons of business associations.

A second type rapidly coming into favor is the residential hotel. This is practically an apartment house with hotel service. Its planning more nearly approaches that of an apartment house, and it will be considered here only to the extent of pointing out the main differences from the commercial hotel. The rooms should be arranged in suites; they should be larger in size than those in a commercial hotel and should be provided with ample closet space. This last is very important. The dining room provisions in a residential hotel are simple. They are generally restricted to one main dining room, a tea room and possibly several private dining rooms for the use of the residents, and a small banquet and ball room to take care of moderate-sized social functions. The lobby can be reduced to such size as will serve only the needs of a reception and waiting room.

*General Plan Requirements.* The beginning of any hotel planning problem is in the study of the lot that has been selected. Points affecting the choice of a site are definite and are discussed elsewhere in this issue. Assuming that a suitable site has been chosen, the first determination is the relative worth and importance of the surrounding streets and their relation to the automobile thoroughfares and accessibility to the one or more railroad terminals in the town.

It is desirable when grade conditions permit and the surroundings and traffic are not detriments, to arrange the entrance on the highest street. This permits the service being taken on a lower floor and also permits of all the public rooms surrounding the main lobby obtaining natural light.

A rectangular lot will permit of the most compact development of plan, and it will necessarily follow that a hotel planned on a lot of this type will be more economical to operate. While it is not impossible to plan a building on an irregularly shaped lot, the units of the plan are more or less scattered



necessarily, and the problem of co-ordination is extremely difficult to solve. It is usually more desirable to secure a lot of rectangular shape even with some sacrifice of location and it should further have such area that a hotel can be planned to go to the limit of building height, if there is such a limit in the city.

It is considered the best practice to eliminate whenever possible interior courts, and in addition to plan the building so that all of the courts will be assured permanent light. The open court makes practically every room an outside room—an item of importance to the owner, and with care in orientation, a very large portion of the rooms can be assured direct sunlight and the benefit of prevailing winds.

In any plot of ground it is desirable at the outset to give consideration to the future growth of the hotel to meet increased demands. There are two ways of making provision for this: the first is to so plan the building and the structural steel as to permit of the addition of extra stories on top of the original building; the other is to plan for only a portion of the property, reserving the remainder of the lot for future additions. The last mentioned method will in most cases be found the most desirable, as the future additions can be erected with the least disturbance to the original building. The extension of service quarters should not be overlooked; in the first method the full equipment or space reservations for it would need to be made in the original building; the second method is more elastic in that additional quarters can be incorporated in the new construction when the exact nature of the demands are known.

Where there is no question as to the necessity of increased capacity in the almost immediate future, the building structure necessary to provide additional guest rooms can be erected as part of the primary building operation and the extra space devoted, until such time as it is really needed, to office building or similar purposes. In the Statler Hotel, Buffalo, the two upper floors of the building are now in use as offices and are so planned that they can readily be converted into guest rooms by the extension of plumbing and steam lines and the installation of bathrooms. The Wilmington Hotel, in Wilmington, Delaware, has been built in two sections, one of which is now used as an office building; the office corridors are continuations of the hotel corridors and the floor levels the same, so that as the hotel requires additional space a floor of the office building portion may be taken over. In the Hotel Texas, Fort Worth, some of the typical floors are rented as hotel apartments. Only one bathroom to a suite is completed; space for the number necessary for single room occupancy is provided, however, and for the present use serves as commodious closets.

*Economic Considerations of Plan.* The hotel plan presents a problem of great complexity from

the economic viewpoint. The non-revenue producing area should be held at all times to the minimum consistent with good service. In general the public and service space should in no case exceed 45 per cent of the cubic contents of the building. In the commercial hotel in small cities every effort should be made to keep this percentage to 25 or 30 per cent of the total cubic contents.

After a study of many hotel plans it is apparent that it has been the usual practice in planning the typical floor, after the general arrangement of the elevators, corridors, and wings had been determined, to devote exhaustive study to the location of the structural steel columns and then, struggling under great difficulties, to adjust and fit the bedrooms and bathrooms around the steel columns. In planning hotels this process should be reversed. The rooms and bathrooms should be planned in standardized units to conform to requirements of service, and the spacing of the structural steel columns and floor beams then devised to become part and servant of this standard arrangement. This may involve the use of a few additional tons of steel, but greatly offsetting this, a standardized unit, comprising not only the bedrooms and bathrooms, but also the very structure of the building itself, is obtained. Great simplification in the details of this unit is then possible. The economy effected by the elimination of the many odd corners and patches of furring, which are an inevitable consequence of the old method of column dodging, will alone more than balance the cost of the extra weight of steel. More rooms per floor can be secured through the saving of space and the greater compactness of the unit.

The proportionate sizes of the main dining room, breakfast room, cafeteria and grill room must be determined by a study of the local conditions. The same applies to the ball room, banquet room and private dining rooms. Some provision for rooms of this character is usually desirable to a greater or less extent in any hotel—in some cases for entertainment facilities and in other cases to attract conventions. When a roof garden is desired for use as a summer dining room, it is more economical to have it of such type that it can be used during the winter season as a ball room and convention hall. This assures practically a 12 months' operation of this room as against 6 months' operation for two separate rooms.

The most recent development in hotel planning has been the effort to introduce store rental space on the ground floor. While at one time it was generally claimed by hotel operators that stores could be incorporated only to the detriment of the hotel plan, this frame of mind was induced largely by the fact that a ground floor lobby was considered an essential feature in every hotel. It has been proved that a lobby raised above the street level sufficiently to permit of the installation of stores at grade has not been a detriment. This is illustrated in many of the large hotels erected in



recent years. In any event, the lower floor of a hotel should be planned to permit of the easy and economical alteration of the ground floor into store space. Under existing conditions it is important that no large areas on street frontages be placed a half-story or less below grade, because of the difficulty such a scheme presents in alterations.

Where the area of the property permits, it is very often possible to plan an interior lobby a half-story above the street and the public rooms surrounding this lobby one full story above the street. This will permit having stores below the public rooms at street grade. A plan of this type affords great possibilities in decorative treatment owing to the attractiveness of the various levels between entrance, vestibule, lobby and surrounding public rooms.

When the lobby is placed above the street, it is desirable to plan an arcade from the street level to the passenger elevators to provide elevator service to elderly and infirm people who might object to climbing the stairs to the lobby. This arcade can be planned so as to give access to the rear of the store space, which greatly enhances the store value and provides additional show window space. It should always be borne in mind that the population of a hotel itself usually adds materially to the value of the stores.

It is also desirable, when the size of the property or other conditions do not permit of the ball room or banquet hall being located on the same floor as the lobby, to locate these rooms on the mezzanine floor, as this facilitates service from the main kitchen to the ball room and banquet room, and if adequate stairways are arranged between the main lobby and mezzanine it will relieve the passenger elevators of a great deal of traffic, and possibly permit of a reduction in the number of passenger elevators.

*Detailed Plan Requirements.* The essential parts of a hotel building can be grouped under five heads:

1. The typical floors, comprising the guest bedrooms and parlors.
2. The sample room floors, comprising the rooms for the display of samples and for the accommodation of the merchants displaying them.
3. The public floors, comprising the public lobbies, dining rooms and other rooms devoted to the general use of the public.
4. The function floor, comprising the ball rooms and banquet rooms of various kinds.
5. The service parts, compris-

ing the kitchen, mechanical departments, and, in short, all of the innumerable units necessary to supply the service to the other four parts, and to provide accommodations and service for the employees.

In practically every hotel the plan of the typical guest room floor should be the controlling element, as after all the sale of rooms is the greatest source of revenue, and no sacrifice of it should be made to obtain effects on public floors. Next in order of importance is the ground floor, and in a hotel with social activities, the entertainment floor would logically follow in degree of importance.

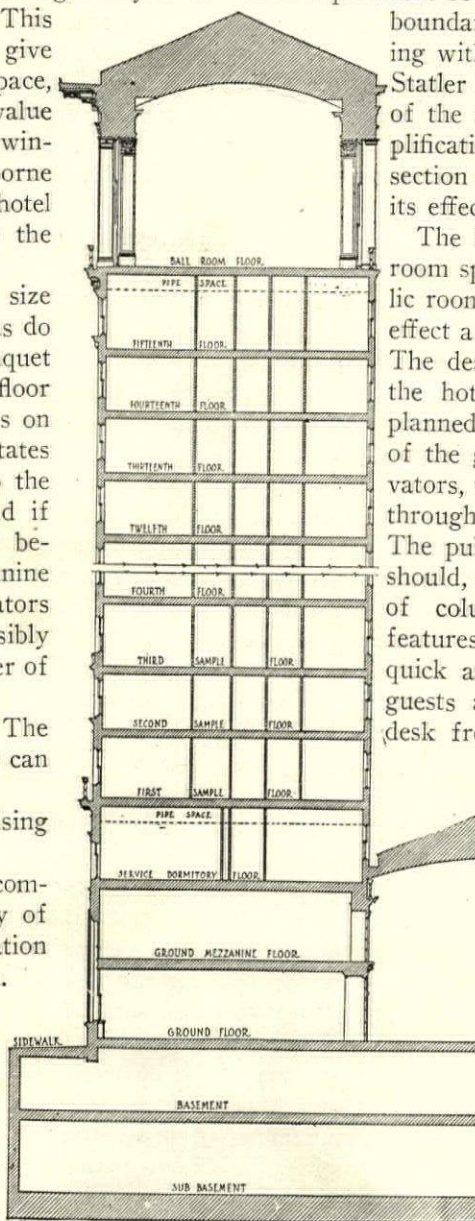
It is, of course, obvious that all of these floors and also the various service floors are very closely related, and that the entire plan of the building must be considered as a unit. It is essential to keep constantly in mind the necessity for simplification. Each section of a hotel is planned to deliver a certain type of service to the guest. This requires that each department be planned as a complete unit with

boundaries well defined and not merging with those of any other part. The Statler Hotel, St. Louis, is an example of the application of this idea of simplification, and an examination of the section reproduced herewith will show its effect on the layout of the building.

The lobby is the heart of the public room space, and the various other public rooms should be carefully studied to effect a convenient arrangement with it. The desk must be in plain sight from the hotel entrance and should be so planned that there is a direct progress of the guest from the desk to the elevators, without the necessity of crossing through the lounge space of the lobby. The public space in front of the desk should, whenever possible, be kept clear of columns and other architectural features which might interfere with the quick and comfortable registry of the guests and with the visibility of the desk from the entrance and elevators.

Ample space should also be allowed in front of the dining room entrance and of the passenger elevators so that there is no crowding at any one of these points.

The main office desk should be so planned that the portion nearest the main entrance contains the registry and information wickets and the house telephones. At one side of these units should be located the space containing the mail and key racks, and at the opposite end of the desk there



Section of Hotel Statler, St. Louis



should be located the cashier's desk and bookkeeping departments. Immediately behind the desk and screened from the public, such working quarters as are required for mail sorting, credit department and assistant manager's office should be arranged. It is desirable, but not necessary, to have the administration offices in direct communication with the main office desk, either directly back of it or on a mezzanine floor directly above it and accessible by means of private stairways.

It is the practice in the larger modern hotels to provide each floor with a room clerk's desk at which the guest obtains his mail and keys. This necessarily alters the layout of the main office desk and permits of a reduction in the amount of space devoted to the mail and key racks. In any hotel having a capacity of more than 700 rooms it is desirable to provide floor clerk service.

Provision should be made at the front office desk for safety deposit boxes and larger boxes to receive sample cases of jewelry salesmen, etc. These are usually under the control of the cashier's department or the assistant manager's department.

At some point at or near the main office desk there should be provided a table for the captain of the bell boys, equipped with electrical duplicating writing machines through which messages are sent to the captain and in turn transmitted by him to the bell boys. The porter's desk is usually located near the elevators and should have direct access to the service elevator hall. In connection with it there should be a waiting space for porters.

While in most cases it has been found desirable to group the elevators, main desk and lobby lounge space in one large room, it is often desirable to provide a working lobby containing the desk, elevators, check room, porter's desk, etc., and a separate lobby lounge. If this is done, however, the lobby lounge should be so planned that guests using it have as full a view as possible of the activities in the working lobby, as it has been found that a lobby lounge isolated from the active main floor of the lobby is not popular.

The main lobby may be so planned that that portion of it adjacent to the main dining room can be furnished and used as a combination palm room, tea room and lounge. The main lines of circulation through the lobby should be planned so that they do not interfere with each other and do not cross the lounge portion.

In a modern hotel of 600 rooms or over, public taste apparently prefers a two-story lobby. In houses of smaller capacity large space cannot be profitably devoted to the public rooms, and with good designing a lobby of one story can be made very attractive. The clear ceiling height of such a room should range from 15 to 18 feet. In a two-story lobby it is desirable to have the mezzanine floor between  $12\frac{1}{2}$  to  $13\frac{1}{2}$  feet above the main lobby floor level; this provides ample ceiling height for the stores and other rooms located under the mezza-

nine floor and yet keeps the mezzanine lounge level within comfortable visual distance of the main lobby floor.

It is always desirable to group the passenger and service elevators together, and they should have as central a location as possible. The combination provides better service to the guest, through being more convenient for the employees. It brings all of the overhead traction elevator machinery under one roof and one control. On the ground floor it facilitates the service of the correlated departments of the front office, porter and bell captain.

Passenger elevators particularly should always be planned in one bank rather than in two or more isolated banks, as otherwise the service will be very uneven. In large hotels it is more desirable to locate the elevators in two banks on either side of one elevator lobby rather than one long run. An arrangement of this kind would be considered as being in one bank, since they are all located about one lobby and all clearly visible to the guest.

It is desirable to provide the elevator lobby of the typical floors with swinging doors to act as a noise buffer between the elevator lobby and guest room corridor. In any event, however, every effort should be made to avoid the location of elevator shafts adjacent to a guest room partition.

Provision of some kind should be made for the conveyance of automobiles and other large articles from the street to the main ball room by means of a large lift or large driveways to the street; this is essential for the proper handling of exhibitions now frequently held in hotel ball rooms.

*The Guest Room Unit.* Since supplying rooms constitutes a major portion of the hotel's service to guests, it is obvious that a preponderance of study should be given to the plan of the typical guest room floor. The average size room used in modern hotels is approximately 10 to 12 feet in width by 16 to 17 feet in depth. The majority of rooms should be of this size, and there should be a certain percentage of smaller rooms, ranging down to 10 x 12 and the larger rooms to a maximum of about 15 x 18, with a small percentage of parlors averaging about 16 x 20 feet. A clear ceiling height of about 9 feet, 2 inches is standard, but in some instances this has been successfully decreased to 8 feet, 8 inches. Where possible, a flat ceiling is desirable.

While it is always desirable to obtain the maximum capacity of rooms to a floor, this should not be done at a sacrifice of room size and room light. It is almost as economical, if better rooms and lighting can be obtained, to plan fewer rooms to a floor and obtain the desired number of rooms by the addition of an extra story or two. Every room should be so planned as to permit of a proper furniture layout, and it is always desirable to show the location of the important pieces of furniture on the floor plans in order that lighting outlets can be properly located.

In the modern hotel there is no question about the



importance of baths—every room, including the typical floor parlors, should have a private bath. Even where a hotel is planned and the cost does not permit every room being provided with a bath, some provision should be made in the plan for the future installation of baths.

There has always been much discussion of the relative merits of the inside and the outside bathroom. In operation it has been clearly demonstrated that in the commercial type of hotel the well ventilated inside bathroom is far superior to the outside. In the ventilation of the former the air is always passing from the bedroom by means of a small space left between the bottom of the bathroom door and its saddle, through the bathroom and into the ventilation shaft by means of a register opening in the bathroom wall. This current of air can always be maintained positive, whereas in an outside bathroom pressure of air from an open window therein will often reverse this current and force the bathroom odors into the bedroom. The parlor suites may be provided with outside baths to meet the occasional demand for this type.

The detailed planning of the guest room unit is susceptible of a number of variations. A number of schemes are indicated by the accompanying plans. The preponderance of favor today is for the double bathroom unit placed on the corridor end of the rooms as shown in Fig. 1. The small vestibule between the corridor and the bedroom, created by this arrangement, is valuable as a transitional entrance to the room, acting as a buffer between the guest and the noises and light of the public corridor at night. In it can be placed the doors to the bath room and the clothes closet, thus screening the entrance to the bathroom from the bedroom, and giving more wall space and the possibilities of better furniture arrangement in the bedroom. By its use the greatest number of rooms per floor can be obtained, always an essential requirement where the height of the building and the area of the property are both limited. Any desired number of these bedrooms can be arranged en suite, but the tendency today is to limit inter-communication between rooms to the corner suites and a few tiers of rooms in the center of the building, so that this advantage is not of great importance. The use of this scheme results in a wider building wing, always more economical in

construction because a minimum amount of exterior wall per bedroom is thus secured, and because, in a high building, less steel for wind bracing is required, owing to the wing's greater stability.

Bath rooms are preferably divided into two types—tub baths for the higher priced street rooms, and shower baths for the lower priced court rooms. In planning, each of these types should be standardized into a typical unit, consisting of two bath rooms with a common vent and pipe shaft between them. This shaft must always be at least two feet wide and should contain all of the main lines of hot and cold water supply, drainage, steam, ice water, and other piping. It serves also as the bathroom ventilation shaft, being connected with a common plenum space under the roof.

The bath room fixtures can be so placed along the wall of this shaft that instant access may be obtained to their several systems of branch piping by means of a hinged medicine cabinet and mirror frame located above the wash basin and opening into the shaft. Architects should never lose sight of the fact that all plumbing and steam lines will sooner or later require replacement, and they should therefore be placed in shafts that will permit of replacement with the least possible damage to partitions and general disturbance to the guests of the house.

It is always economical to have corridors so planned that they serve bedrooms on either side. Main corridors are usually 7 feet, 6 inches in width and secondary corridors 6 feet in width. They are usually provided with marble, glass or terrazzo wall bases and floor borders, and should always be planned to receive standard widths of carpets between the inside edges of the floor border. For secondary corridors a 4 feet, 6 inches width of carpet is used, and for main corridors a 6-foot width. If a corridor is planned so as to require a width of carpet over 6 feet it adds greatly to the cost of carpet, as this additional width must be obtained through sewing on borders. There is no loom that will weave commercially carpets over 6 feet in width. Likewise, if possible, bedrooms should be planned in multiples of the standard carpet width—2 feet, 3 inches.

Large closets are desirable, and a room should be provided with one whenever possible. It is essen-

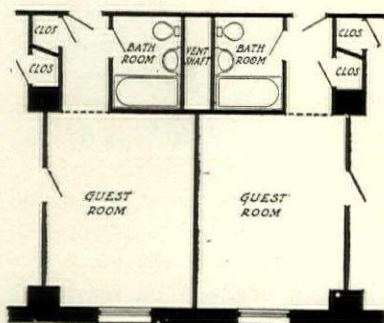


Fig. 1. Double Bath Room Unit between rooms and corridor

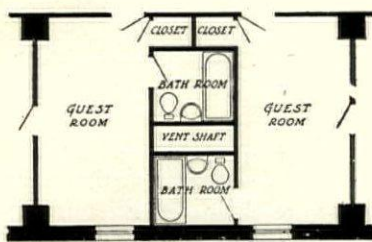


Fig. 2. Double Bath Room Unit between guest rooms

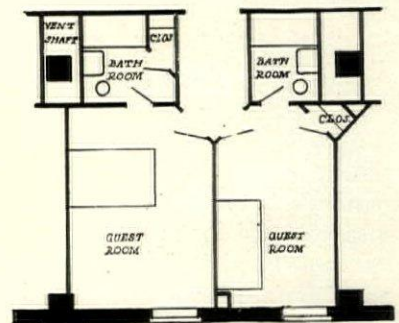


Fig. 3. Guest Room Unit with common lobby to save space



tial that a room planned for double occupancy have ample closet space. In some of the smaller rooms the closets may be omitted and wardrobes substituted. A closet should never be less than 22 inches in depth—large enough to take a coat hanger. For the average room in a commercial hotel, where used chiefly by traveling commercial men, a closet of 22 inches in depth by 3 feet in length provides ample facilities.

A modern device that is proving valuable in speeding up and extending service to guests in their rooms is the room door with a double-doored compartment opening to both room and corridor. Its detailed construction permits the servant's access to the compartment from the corridor without entering or seeing into the room. In appearance the arrangement resembles a single-panel door with the panel a convex surface on each side to provide the necessary compartment depth.

Every typical guest room or sample room floor should be provided with linen, storage, maid and slop sink closets—one or more of each, depending upon the size of the plan. The linen closet or maid's room should provide space for keeping the linen and supply wagon now in common use in the larger hotels. To complete the typical floor layout consideration must be given to the amount of room food service required. In first class New York hotels of the type of the Biltmore and Pennsylvania pantries to provide this service are located on alternate floors. In a hotel of the more purely commercial character, where the demand for this service is less, it is practical and desirable to omit the floor pantries and have all service come direct to the rooms from the room service pantry adjacent to the main kitchen. An ample service hall should be provided on every floor, and it should be especially large where it is expected that there will be a considerable amount of room service. When floor pantries are incorporated it is the usual practice to provide dumbwaiter service to them from the kitchen, although some hotel managers prefer that the connection be made by means of service elevators which permit the handling of food in larger quantities and the use of heated wagons.

The number and locations of stairways in hotels are usually governed by local building ordinances. They are very seldom used by the guests, and are provided almost entirely for fire exit purposes. There should, however, be a service stairway in connection with the service elevator hall to relieve the use of the service elevators for inter-floor traffic by employees.

*Sample Room Floors.* In the usual commercial hotel a certain number of rooms must be arranged particularly to meet the needs of salesmen who want display space for merchandise. Salesmen's samples are usually packed in large trunks, and the rooms are therefore located with special reference to their accessibility from the freight elevators. These rooms also serve as sleeping rooms for the mer-

chants, and this function occasionally justifies their being grouped as a part of the typical guest room floor. It is better practice today, however, to arrange them apart from guest rooms on one special floor or more as requirements dictate, and preferably on the lower bedroom floors immediately above the public rooms or the service dormitory floor. The advantages of this arrangement are many. The corridors, rooms, walls, doors and door frames can be designed to withstand the rough usage incident to the handling of the sample trunks; the freight elevator service necessary in this handling is reduced in run, and consequently is capable of better service; persons calling to inspect the display of samples do not feel that they are intruding upon a sleeping-room floor; it permits of architectural expression on the exterior through the use of larger windows, and consequently provides better light for these rooms. It facilitates the service of the room clerk in the front office, because it differentiates most distinctly on his room rack the sample rooms from the guest rooms, and prevents confusion.

The sample room must provide a dual service. Primarily it must be suitable for the display, to their greatest advantage, of the various kinds of merchandise and samples. Secondly, as the merchant, for reasons of economy and surveillance, usually demands sleeping and living accommodations in the same room with his display, it must provide these without interfering with the display, inspection or sale of the merchandise. In the Hotel Statler, St. Louis, is a very good expression of the sample room. In these rooms the beds, when not in use, fold back—"disappear"—into a ventilated closet, and the dresser and the entrance to the bathroom are located in an alcove. This arrangement leaves the room proper clear of all furniture other than that required for sample display purposes, provides the maximum amount of wall space, and removes from sight all suggestion of a sleeping room, which might be objectionable to visitors calling to inspect the display. The radiators are low to permit of sample tables being placed over them; the room door openings are of extra width to allow the passage of the big sample trunks, and the jambs are of steel to withstand the wear and tear incident to their passage. The lighting fixtures and receptacles are designed and located to give the best lighting to the greatest variety of merchandise.

*Kitchen and Service Requirements.* A multiplicity of kitchens should be avoided, as the apparent necessity for them is usually due to improper planning. It is generally desirable to plan the main kitchen and the secondary service kitchens or banquet pantries so that all of the food is prepared in bulk in the main kitchen and only kept warm and served in the secondary kitchens. In connection with the main kitchen there should be a room service pantry from which all of the food service to guest rooms is handled. Generally this room service pantry should be located so as to be accessible both



to the main kitchen and to the service hall and elevators. This will provide efficiency of service.

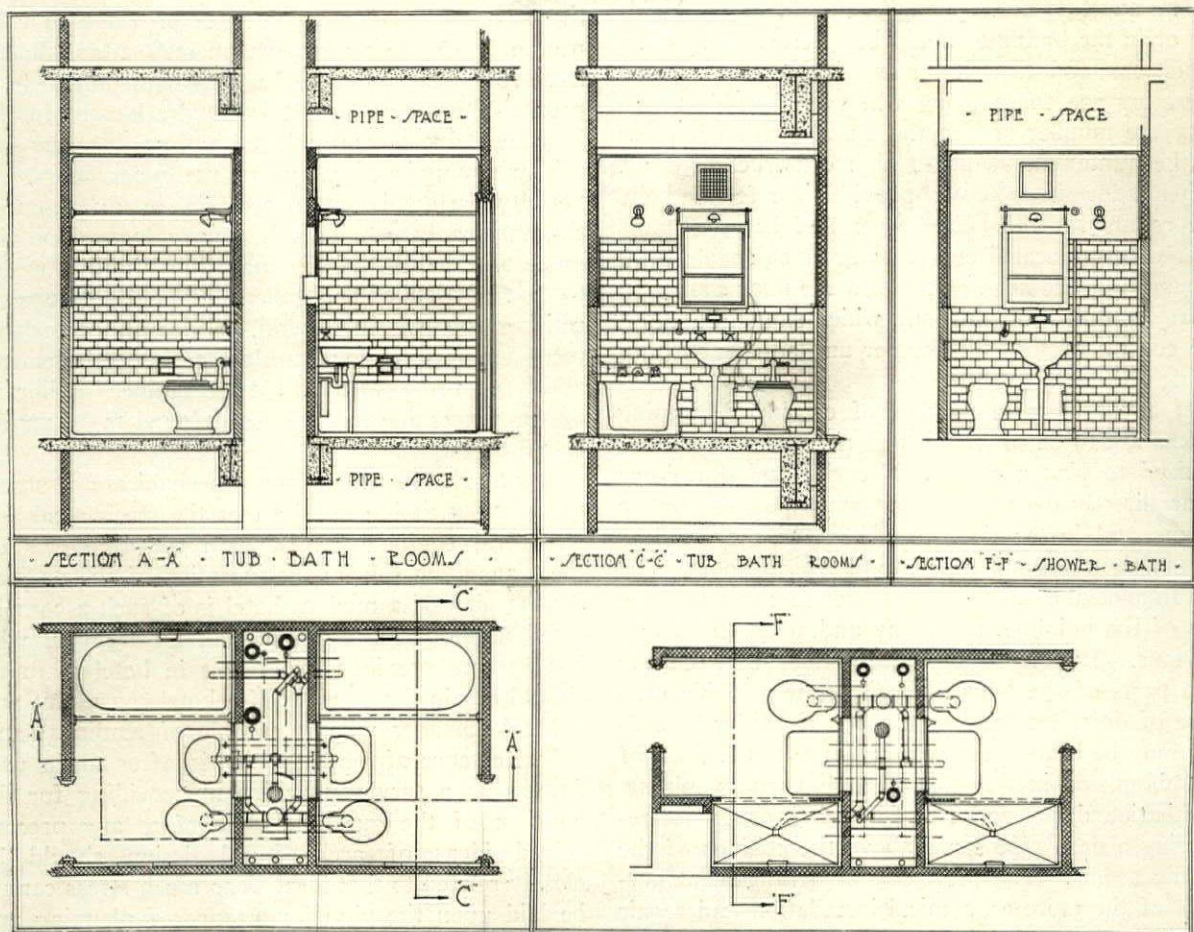
In the planning of the Statler hotels, one requirement that is insisted upon whenever possible is that the main kitchen must be located on the same floor level as the principal dining room. To this principle has often been sacrificed the possibility of securing much valuable outside rental space on the ground floor in the form of stores and shops—rental space which in the majority of instances is in other hotel plans the governing factor that controls the architect in the arrangement of the public floor and in the relations of kitchen and dining rooms. Good restaurant service demands ready accessibility to the kitchen, and if this is not assured the return from store rentals will not repay the damage suffered by the hotel. When possible it is better to have the kitchen located so that it can obtain natural light, but in many cases natural light is too important for the public rooms to devote it to the kitchen, and it is then feasible to place the kitchen in the basement.

In some hotels the kitchens have been located on a floor above the dining room, making it necessary for the waiters to serve downstairs. Now, if there is one thing more difficult and trying than to carry a loaded tray *upstairs*, it is to carry one *down*—one trial will convince anyone. Yet many hotels are designed (but by no means operated) in blissful

ignorance of this fact. Unusual importance should be attached to the dining room service when the kitchen is on another level. The serving pantry adjacent to the dining room must be equipped with refrigerators, warmers, silver and plate racks, and service counter; with an endless chain dish conveyer to carry all soiled dishes to the dish-washing department below; with a linen chute to carry the soiled linen to the laundry; with a double stairway designed to prevent the crossing or congestion of waiter traffic; and in the arrangement of the kitchen below, everything required by the waiter should be in relative proximity to the service stairway.

With proper methods of forced ventilation it is not essential that a kitchen have natural ventilation, and in fact most ventilating engineers have an objection to a kitchen with natural ventilation, since an open window would short-circuit the ventilating system and carry the various kitchen odors into other portions of the house.

The service entrance should be located as far as possible from the public entrance to the hotel and on the least desirable street frontage. Where possible, it is desirable that this entrance be located under the building and reached by means of a recessed driveway in order to avoid congestion of sidewalks by baggage and food supplies, and also to

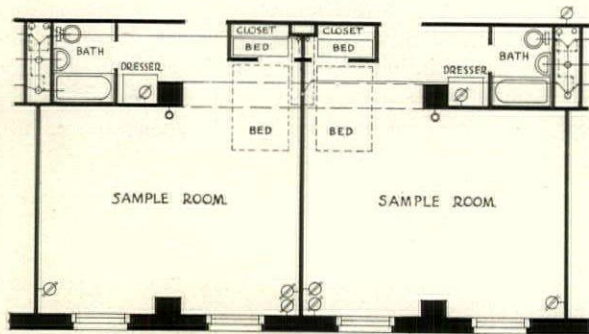


Details of Standard Tub and Shower Bath Rooms  
Geo. B. Post & Sons, Architects



prevent the noise of handling baggage from reaching the guest room floors to the annoyance of guests.

This service entrance should open upon a wide service corridor serving the various store rooms, trunk rooms, etc., and should have direct access to the service elevator hall. It is found desirable to locate the service lifts for handling baggage, ashes, supplies, etc., at this service entrance in order to concentrate control of the employees. An entrance for employees separate from the service entrance should be so planned that all the help sleeping out of the building must pass by the timekeeper's office, and it should be within easy access of the various help's locker rooms and toilets.



Sample Room Plan, Hotel Statler, St. Louis  
Geo. B. Post & Sons, Architects

The question of "sleeping" help out of the building or in the building should be determined by local conditions and the character of the help. Hotel operators are endeavoring wherever possible to reduce the number of sleeping quarters for employees to the minimum, owing to high construction costs. When a dormitory floor is provided for female help, the rooms for the housekeeper and her assistants should be so located on this floor as to enable them to supervise the help. On this same floor should be located the main linen room, which should be under the control of the housekeeper and adjacent to her living quarters.

If a considerable number of employees' sleeping rooms are to be provided, this circumstance can be utilized to plan a combined service and dormitory floor directly over the floors containing the public rooms and below the main shaft of the building formed by the sample room and typical floors. The advantages of such a location over that usual, at the top of the building, are many and, after discovery, obvious. It acts as a "buffer" floor between the two parts of the house. It serves the double purpose of dormitory and pipe space, as under its ceiling may be located the various large trunk lines of plumbing, drainage, steam, and vacuum piping, ventilation ducts, and electric wiring, otherwise requiring a deep pipe space above the ceilings of the public rooms. The service floor arrangement permits of the more economical installation and repair of these lines; the danger of leakage and consequent damage to the costly decorations below is

minimized, as not only will the waterproof cement floor of the dormitories hold the water longer, but the fact that this floor is constantly occupied will ensure instant detection, alarm and quick repair.

Whenever possible, the laundry should be located in the basement so that the heavy machines can be placed on independent foundations. If the laundry is located on one of the upper floors of steel construction, the noises from the machinery are very apt to be carried to the guest room floors through the structural frame of the building. Where possible, there should be a conveyer from the main laundry to the linen room in order to relieve the service elevators of this traffic. There should be a linen chute from a maids' closet or from the service hall on each guest room floor to the linen sorting room adjacent to the main laundry. There should also be a rubbish chute with openings from each guest room floor to a rubbish sorting room in the basement. Many hotels provide a room in connection with this rubbish room called a "baling room."

Considering special features of the plan that might come under the head of "concessions," it is interesting to note that several modern hotels have found it desirable to provide dressing rooms and bathrooms for the use of guests while waiting assignment to their rooms, and for the use of dinner guests who require dressing rooms and baths, but not sleeping accommodations. In several hotels these accommodations have been provided in connection with the valet departments. Many hotels have found the complete Turkish bath unit to be a profitable installation. It is usually located in the basement, due to the difficulty and cost of carrying the swimming pool on any of the upper floors. A "beauty parlor" is also one of the requirements of the modern hotel. This is usually located on the mezzanine gallery of the main lobby and adjacent to that portion of the gallery devoted to women's retiring rooms. In general, service and entertainment features for men are located in the basement, and those for women on the mezzanine. A library on the mezzanine has also been found to be appreciated by guests.

In order to secure a proper mechanical and structural layout, it is essential that the mechanical and structural engineers work with the architects on the plans almost from the inception of the project. As the plan of a modern hotel is of such a complicated nature, it is essential that an architect who has had no previous experience in hotel planning should obtain the services of a hotel consultant and a hotel manager who is capable of reading plans.

The essence of the hotel plan is, after all, its usefulness as a service machine in providing for the comfort of the guest, and therefore any preconceived ideas of architectural design should be closely related to that idea. Too much stress cannot be laid upon the vital importance of planning and equipment, and upon the fact that the architectural treatment of the building should be secondary.



# Economics of the Hotel Project

By DANIEL P. RITCHEY

*Consultant in Hotel Planning and Operation*

THE first practical business consideration relative to a new hotel project is the preliminary analysis of community hotel requirements in order to measure local interest and support and to determine the requisite size and type of hotel, together with the most logical site. Certain phases of this question have already been covered in other articles in this issue, but there are a few points which are worthy of special consideration. In smaller cities or towns the moral support and recognition of civic organizations such as chambers of commerce is considered of more importance than direct financial support. The actual financing of the project, if any part of it is to be undertaken through civic interest, should be developed through a small group of leading citizens, such as bankers and local merchants rather than directly through civic organizations, in order to facilitate the handling of the actual business transactions involved; otherwise, a complex condition arises, involving many personal interests and thus making the project more difficult to handle in a businesslike and politic manner.

In selecting a site for a hotel to be located in a smaller city or town, the primary considerations are convenience of transportation, the possibilities presented by main arteries of motor travel and the physical characteristics of the land in question. In the last few years the various types of hotel guests have become educated to demanding better service and different surroundings, so that in locating new hotels there is an inclination to get away from the purely commercial centers and to take patrons to a section of the city that has the quiet of residential surroundings, but within reasonable proximity to amusement centers. In the larger cities the definite requirements of hotel types serve to indicate locations; but in smaller cities it is well to consider the possibility of locating in a logical section which is subject to development by attracting civic growth in that direction. It is not only true that hotels should be located in the path of high class residential or business expansion but also that in many instances the location of a new hotel will definitely encourage such growth. It is also well to consider the possibilities presented by adjacent apartment building development which will lend support to the restaurant and to the concessionaires depending upon transient trade as well as upon that of hotel guests.

In the matter of relative cost of land and build-

This article is a sequel to "Practical Points in Hotel Planning," written by the same author for THE ARCHITECTURAL FORUM of December, 1921. After this article was presented, architects and owners submitted to the FORUM Service Department and its regular Consultation Committee, of which Mr. Ritchey is a member on hotels, plans for new hotel projects aggregating over \$40,000,000 in construction cost. A careful analysis with constructive criticism was made for each project submitted. In the article herewith presented an effort has been made to avoid covering points discussed in the first article.—THE EDITOR.

ing, it may be taken as a general economic theory that land should not exceed 20 per cent of construction and equipment cost. This point is primarily determined by community conditions affecting sub-rentals. If the primary income of the hotel is from the rental of rooms, a 20 per cent relationship limit should be maintained. If, however, there is an opportunity for providing stores and valuable concessions in the plan, it is logical to pay as much more for land as the additional sub-rental income may show to be a good investment as compared with the same space rented on a prevailing room rental basis. For example, a hotel located at 57th street and Madison avenue, New York, would probably bring no greater room rentals than if located on Central Park West. But in the Madison avenue location there might be a sub-rental equal almost to one-half of the income from rooms. Therefore a much higher land investment could be made at that point than at Central Park West, which is strictly residential in character.

Of course, the 20 per cent limitation must be highly flexible, and to a certain extent is regulated by the kind of hotel which is desired for the community. If transient trade were the larger element, it would be well to pay more for the land in order to obtain a more convenient transient location. If the hotel occupancy is to be divided between transient, semi-residential and club types (with a floor or two of smaller rooms with group bath and toilet conveniences to be offered at lower rents), the cost of land would probably be compatible with the rentals to be obtained from the class of guests and tenants anticipated. In the average community the tendency in hotel planning seems now to include not only provision of rooms for transient guests, including commercial travelers, but for housing of community activities and resident guests.

With the increased cost of building construction there is a trend toward the reduction in extent of non-paying public space, and even the provision of entertainment spaces is worked out in such a manner that when these are not in use for special functions they can be employed for the general use of guests, as public space which may be shut off and used for special functions when necessary. Thus, in one of the large older hotels in New York, encroachments have been made on what was formerly dining room space, grills and tea rooms. Here



the dining equipment has been removed, and this space is used for drawing rooms, writing rooms and other public conveniences except at times when it is required for special functions or for afternoon teas. Space which previously was equipped throughout with tables set up for 24-hour service has been doubled in its usefulness and with a reduction in overhead expense.

There are several methods through which the financing of the average hotel project is developed, but the primary problem is usually the first mortgage which may be obtained locally in the larger cities, but rarely in smaller cities or towns. Much of this mortgage financing is carried out by large mortgage bond companies which operate nationally or in limited sections of the country, and while the usual proportion of the first mortgage is 60 per cent of the cost of land and building, it is possible to obtain as high as 70 or 80 per cent where an amortization mortgage requires the payment of from 8 to 10 per cent of the principal each year.

The secondary financing is the more interesting for consideration, and this is usually provided by the sale of stock or second mortgage securities. It is practical to organize two companies, one to be the "holding company" for the ownership of the building and the other company an "operating company," unless the hotel is to be directly leased to an outside lessee.

The more successful manner of promoting the holding company is to present to purchasers of stock an opportunity to share in the profits of the operating company. As an example, we may relate the experience of a hotel owner in an active industrial city where the original hotel had practically outlived its usefulness and the citizens wanted a new hotel. This hotel owner was not financially able to bear the necessary investment cost, but he decided to build a new hotel which would absorb his present property, taking in with him, as joint owners, local manufacturers and merchants. The new holding and operating companies were organized, a long-term management contract given to the original owner, and two-thirds of the stock of both companies was offered locally and quickly absorbed. There was a keen interest in sharing the ownership of the company and profit of the operation. The holding company which financed the building was limited to a profit of 7 per cent in the form of a lease to the operating company, and it was found after going into operation that the operating stock brought up the income on the entire investment to better than 20 per cent. Thus the individual who did not want to limit the investment possibilities of his funds to 7 per cent was attracted to the proposition, and financing was quickly provided.

One of the most successful methods of financing the equity in a new hotel project is to arrange a lease which will obviously insure the safety of this investment with a good return to the investor. The lessee may be a well known hotel man or a hotel

operating company having a sufficient reputation to assure prospective investors in the holding company. In nearly all cases the tenancy of a hotel lease is for 21 years. It is usually desired, but not always required, that if this is to be a newly formed operating company, the manager who may be brought in shall have an investment in the operating company. This is not usually a large investment, probably \$10,000 on a term basis, but it serves to indicate sincerity and direct personal interest.

In the making of the original lease, it is customary that the lessee shall provide his own furniture, and as a rule the owning company accepts this furniture as the final security in making the lease. In fact it is highly desirable that the furniture shall constitute this security, as in case of any default it would be a serious interruption to the hotel's business to have the furniture taken out or subject to process of law. In order to cover the period before the hotel is furnished, a deposit is usually taken on the signing of the lease, equal to the value of furniture, and refunded to the lessee as the furniture actually goes into the building.

There are several forms of establishing rental terms in the hotel lease. Perhaps the most customary method is that the leasing figures shall be established on a basis of net percentage of the agreed appraisal of land and building value. Usually the tenant assumes all taxes, assessments, repairs and similar costs, including a net percentage on the property valuation, which varies from the 4 per cent requirements of large estate owners, to as high as 7 or 8 per cent of the actual investment value. An interesting form of hotel lease which is becoming more popular each year is on the basis of a price per room. Basic values are figured on a net or gross rental by room plus a percentage figure on sub-rentals. In many of the newer hotels, erected by speculative or investment builders, the owner rents the rooms to a managing lessee and retains all concessions and sub-rentals or the sub-rental space only. Thus, in one large hotel now under construction two general leases are presented in which the rooms are offered to a lessee for \$375,000 a year and the stores have been placed on the rental market for \$140,000 a year. This is a practical method of leasing in that it distributes logically divided interests. Where the owner retains sub-rental space, such as stores and shops, it is provided that the lessee of the room section of the building and the restaurants shall provide heat and sometimes light and janitor service in the stores, an allowance being made.

For general figures in estimating leases and furniture costs, it may be assumed that a \$600,000 investment would produce in a moderate-sized city a 200-room hotel, which would be first class in its community. The furnishings in a hotel of that type would cost from about \$500 to \$600 per room, including the furnishing of public spaces and the equipment of the kitchen. For the average resort hotel furnishings are estimated at considerably less,



even as low as \$200 per room in a house of 300 rooms or more, yet appropriate and in good taste.

It is generally figured that a room will be rented 250 days a year, and on this basis the value of the lease may be estimated. The hotel manager will estimate his operating cost at one and a half times the cost of his rent. Thus, in a hotel project where the lease is based on \$300 per room per year, cost of operating will be about \$450 per room per year, making a total cost of \$750 per room per year on which there should be an income of \$1,000 a year to make an attractive lease proposition. Thus, the net income from the lessee's viewpoint should be from 25 to 33⅓ per cent of his rental and operating cost. Out of this net income he must carry his investment interest, furniture depreciation and other business items, but the operating cost on a one and a half times rental basis includes taxes and similar charges.

In selling a hotel lease it is almost an established custom among brokers to show that the good-will value of the lease to a buying tenant will pay out through profits in three and a half or four years. In other words, the good-will of the hotel lease is worth four times its actual annual earnings.

In planning for income-bearing space, other than rooms, it is obvious that this space should pay a higher income than the same space given over to room rentals. Otherwise the introduction of the sub-rental or concession is not logical, unless to be of a service character valuable to the comfort of guests in the hotel. The architect's objective should be that every square foot of the building must produce some kind of income.

It is not considered desirable today to attract inside of the hotel people who are not guests. A great many hotels have removed many of the seats in their lobbies and corridors, and the tendency is to produce more of the club atmosphere, to which visitors to the hotel will come for the purpose of calling on guests or patronizing the restaurants.

The question of obtaining income from sources other than rooms and restaurants has become of the greatest importance in the planning of any hotel. Of primary interest are stores and shops which provide rentals sufficiently high to cause the use of ground floor or mezzanine space for such use. The provision of such shops is also a desirable form of service to guests. The various concessions incidental to the hotel's business should also be carefully studied according to local conditions. A partial list of shops and concessions to be noted in various hotels includes news-stands, theater ticket agencies, cigar stands, barber shops, billiard and bowling rooms, beauty shops, Turkish baths, gymnasiums, stock brokers' offices, railroad and steamship ticket offices, telephone and telegraph rooms, flower, novelty and drug stores, and similar service features.

From a business viewpoint concessions are handled by the operating companies in different ways, according to conditions. Often profitable conces-

sions are operated directly by the hotel management. Where concessions are rented out, it is quite customary to arrange leases calling for a minimum rental and a percentage of the gross income, which varies from 5 to 12 per cent, according to the size and nature of the business. In any event, the space allotted to concessions should be deliberately incorporated in the plan rather than accepted as an accidental development of convenience after the floor plans are completed. If a concession is worth operating at all it deserves a logical location in the hotel plan, both for the convenience of guests and to insure profitable operation. A careful preliminary analysis of concessions should be made to determine present and future local demand and that of the specific traveling and resident patrons of types for which the hotel is primarily intended.

Another subject which should be given serious consideration, particularly for hotels in smaller cities and located on well traveled automobile routes, is the establishment of a garage directly under control of the hotel management. It is realized now by hotel men that an important percentage of guests may be obtained through automobile traffic, and the hotel which has garage accommodations, located conveniently and operated in a dependable manner, is certain to enjoy practically all business accruing in the district from this type of transportation. It is usually the case that guests using automobiles arrive rather late at night, and it is a decided drawback if they find it necessary to search around the town for a garage which may be open and in which it may be safe to leave an automobile with its accessories and traveling equipment.

One other important point should be stressed at all times. That is the grave danger of using inferior structural materials and cheaper forms of mechanical installation and equipment. Every hotel man knows by sad experience the cost of replacements and expensive repairs which may soon develop as a result of false economy in the original investment.

The life of the average hotel building is usually figured at about 30 years on a utility basis, but there is no reason why the investment should be written off in this comparatively short period if construction, equipment and location are wisely selected. Even as a chain is as strong only as its weakest link, so a hotel structure will invariably show a measure of failure in direct ratio to the inferiority of any important installation.

Architects invariably realize this condition when called upon to design any type of building. Unfortunately, however, it is often the case that an owner will hamper the architect's work and jeopardize his own investment by insisting upon false economy in order to hold down the original building cost.

In the building and equipment of the modern hotel there is no place for extravagance—nor cheapness! Every part of this machine called the hotel building must function daily, year in and year out.



# Legal Restrictions Confronting the Hotel Architect

By FRANK K. BOLAND

*Counsel for the American Hotel Association*

IN laying out the plans for a private dwelling or ordinary business building, the architect as a rule is not very seriously hampered by legal restrictions which cannot be readily complied with, but in planning for the erection of a hotel, on account of the complex nature of the structure and its varied uses, the situation is quite different. In the latter case, he must not only consider compliance with existing laws, but he should endeavor to anticipate possible subsequent modifications, amendments and extensions thereof. Too serious stress cannot be given to this thought, and the hotel owner, in planning future buildings, will profit materially by selecting the architect who will consider not only the architectural beauty, design or present economic uses thereof, but also in their construction will endeavor, as far as he can, to provide for such alterations as may be required by future regulations.

The growing tendency of the times is for laws, laws, more laws, and legislators and public officials always lend a willing ear to the public when demanding legislation where the stated purpose thereof is better protection of the health, safety and convenience of the public. Last year our New York state legislature passed an act to amend the labor law, by providing for a state standard building code covering places of public assembly; places of public assembly were defined as those maintained for pecuniary gain, where 100 or more persons assembled for amusement or recreation. Many of our hotels were brought within the purview of this law. The act provided that all such places should be constructed, equipped and maintained so as to afford reasonable and adequate protection to the lives, health and safety of all persons employed or assembled therein, and it authorized the creation of an industrial board for the purpose of establishing a code for the construction and equipment of such places. This act was state-wide in its application, and further provided that the places affected thereby could not be used unless a certificate had been issued by the proper authorities, showing compliance with all the prescribed rules and regulations.

This act necessarily required radical structural changes in many of our existing hotels, a strict compliance with which would practically preclude some of them from holding balls, lectures and other forms of amusement or recreation. However, the labor department, appalled at the enormity of the work required to be done by it under this new law, had the act amended, through its commissioner, so as to exempt places in New York City from its requirements, and hotels of more than 50 rooms in other places outside of New York City.

In New York City our building code, applicable to theaters and other places of amusement (some of

our hotels coming within the latter category), requires that such buildings be approved by the fire and building departments as to conditions of safety in cases of fire or other catastrophe—all of which means an unbearable burden on the hotel owners' exchequers, where legislation of this kind was not anticipated when the premises were originally constructed. Legislation affecting the structural condition of our hotels is constantly emanating from the various public bureaus, health, building and labor departments, compliance with which invariably means an added strain on the owners' finances; how far these conditions may be anticipated is for the far-reaching eye of the architect to determine.

This condition is not local—it is country-wide. For example, from January 1 to March 1 of this year, of legislation introduced in the various states affecting hotels only, California introduced bills to regulate the height of hotels, also to require suitable seats for females when not on active duty, as well as a housing law with strict requirements as to construction and maintenance; Colorado, a bill providing for suitable places for employes to work; Connecticut, a bill to provide suitable seats for employes; Indiana, a bill to regulate steam boiler plants; Missouri, a bill to require fireproof chimneys and non-combustible roofs; New Jersey, a bill to require installation of wire ropes from sleeping rooms, in addition to fire escapes; North Dakota, a bill to require that guests' rooms be equipped with bolts, unlockable from the outside; Washington, a bill to regulate kitchens and dining rooms in basements, and forbidding their maintenance in buildings hereafter erected; and, Wyoming, a bill to provide better sanitary conditions in bakeries, hotels and restaurants. Many of these measures, apparently of secondary importance, have in fact made necessary substantial structural alterations.

With these considerations in mind, the architect who specializes in hotel construction will do well to take every precaution, and not hesitate to obtain expert advice on present and anticipatory legislation, before finally committing himself to a definite plan of construction; on the other hand, hotel promoters will profit much by having these thoughts in mind when advising with the architects selected.

As a result of the increasing complexity of the average new hotel project the fact is indicated more clearly every day that there are four distinct phases or viewpoints involved in each undertaking: financial, physical, management and legal. Each contributes in its own proportion to the problem of *planning*, which is the architect's problem. If any of these phases fails to receive due consideration a weakness develops in the plan which if not immediately effective possesses potentialities of danger.



# Modern Hotel Construction Methods

By W. J. THOMAS, *Engineer*

*George B. Post & Sons, Architects, New York*

THE construction of a modern hotel is an activity of unusual complexity. To a degree greater than in other types of building there must be co-ordination of numerous trades and special equipment makers; materials of construction and mechanical equipment must be selected and installed to endure as nearly as possible throughout the active life of the building without serious replacement, and the whole must be delivered for actual hotel operation on a date fixed long in advance by financial and other considerations. The use of the building and the fact that it represents a long term investment of the owner require that irrespective of local building ordinances the construction should be made as thoroughly fireproof as practicable.

When the owner has made a selection of a site as one suitable for the location of a hotel, the engineer's duties begin. The first step should be that of procuring an accurate survey of the ground giving all information as to property and street lines, locations and encroachments of adjoining buildings; also elevations of sidewalks, curbs, and intersections of lot lines, and in addition all possible information regarding public and private utilities.

The engineer's most important duty is to report on the character and composition of the subsoil underlying the site. He should set forth the conditions that may be expected, so that proper precautions may be taken in the design and construction of the foundations and for the protection of adjoining buildings. Whenever possible, such an engineering survey should be made before the purchase of the property. This precaution would prevent the selection of a site involving expensive and difficult foundation operations, when in many instances an equally good location, from a hotel operator's standpoint, requiring less expensive foundations, could have been secured.

Before any plans have been started the engineer should make a personal inspection of the site and the surrounding neighborhood so as to acquaint himself with the general topography of the district and observe the type of buildings already erected. The superficial information gained by this inspection will bring to the attention of the observer any peculiar conditions requiring special treatment, such as outcropping rock, proximity to a stream, condition of buildings adjoining the lot lines, or steep street grades which affect the adaptability of the site for foundations. This will lead to further inquiry at the local building department, architects' and builders' offices as to the type of foundations used, soil loads generally adopted, and the probable subsurface conditions to be encountered. All these precautions

precede and lead to the actual mechanical exploration of test borings and soil loading tests, which should be conducted regardless of conditions reported to have been found even on the property adjoining the site.

The borings and samples of the materials found for each foot in depth will make possible the determination of the stratification and nature of the soil below the surface of the site and will also fix the ground water level, from which the probable hydrostatic head to provide for on basement floors and walls can be figured. From this data the engineer can decide on the type of foundation best adapted to subsurface conditions. If spread footings are found to be preferable, load bearing tests should be made at the level of the bottoms of the lowest footings so as to arrive at a safe bearing value per square foot to use in the design of the foundations. Should the soil conditions and the ground water level be more favorable to the use of piles, the load-carrying capacity per pile should be found by driving test piles at the level of the bottom of the footings. It may be found necessary to sink either open or air caissons to rock or other good bearing strata for the foundations. If, when sinking, a satisfactory bearing level has been reached, a careful inspection should be made to obtain accurate knowledge of the underlying soil characteristics. When indications so warrant, tests should be made on the bearing value of the soil at the bottoms of the caissons.

Where the ground water level with relation to the basement floor and other underground floor areas is such as to produce hydrostatic pressure on the floors and walls below grade, it will be necessary for the designer to consider the construction of these portions of the work in connection with the foundation design, and provide floors and walls of sufficient strength, properly anchored to the foundations, to withstand the water pressure.

The use of the underground areas for the power plant, engine-room, laundry and other working or service parts, and in many instances for public parts of the hotel, such as grill room, Turkish baths, etc., necessitates provision for water-tightness and damp-proofness which should be given the same study and attention as that given to the foundations. The material and design of the walls and floors should be considered in deciding upon a method of waterproofing; also the location of water and steam service lines to mechanical equipment, as well as the drainage and waste lines, will have considerable bearing on the method adopted.

Concrete, reinforced, is probably best adapted to the use of basement walls and floors which are sub-



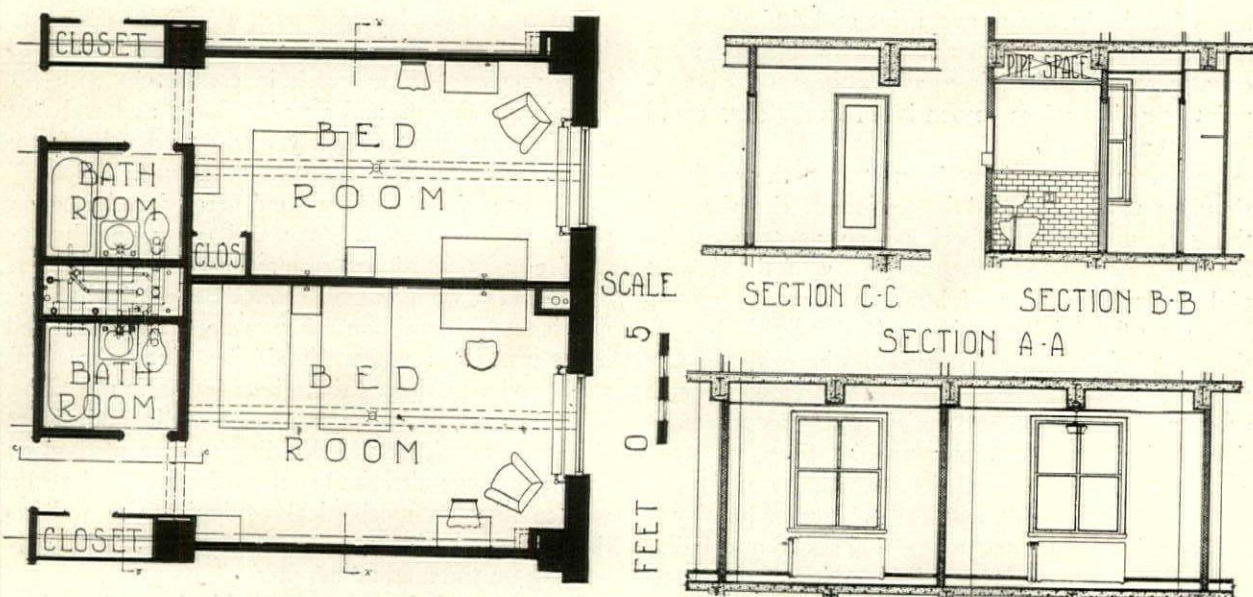
jected to water pressure, principally because of its cheapness and its ability to resist tensile stresses, which permits of a design using a minimum thickness for retaining walls and basement floors. Its freedom from joints makes waterproofing more effective.

Waterproofing may be accomplished by either the membrane or the integral method. The membrane method consists of using felt or fabric as a reinforcement, saturated with either asphalt or coal tar pitch and applied to either the exterior or interior of the surfaces to be waterproofed by building up, in shingle fashion, the layers of membrane alternating with heavy moppings of the waterproofing material. The integral method is that wherein the waterproofing materials, consisting of paste, liquid or powder, are added to either the gauge water or the cement used in concrete mixtures. Both of the waterproofing methods have their special advantages, and the waterproofing problem of any particular structure can be solved only after a thorough study of the controlling factors in the design. In general, the integral method is used for vertical surfaces and the membrane method for horizontal surfaces. The floor surfaces of working parts of the basements are generally granolithic with membrane waterproofing between the finished surface and the top of the slab. An extra precaution is to place integral waterproofing in the slab. In kitchens and the connecting departments, quarry tile makes a good surface. In the working parts the usual waterproofing will provide dry walls, and the cement or tile finish can be applied directly to the concrete. In the public rooms of the basement it is well to fur the walls sufficiently to give a generous air space between the finished interior and the structural concrete to care for condensation.

Just as in the development of the architectural plan, the layout of the typical bedroom floor is the

key to the structural scheme of the building. The steel-framed structure is best adapted to the needs of a hotel because of its elasticity in meeting varying conditions of load and span and for its rapidity of construction. Reinforced concrete has its special merits also, but it is not economical unless it can be reinforced in two directions. This necessarily means girders on all four sides of a bay, and the girders projecting into the rooms and running across their widths are serious handicaps to good room arrangement. In general, it may be said that an economical architectural room layout will result in an economical steel layout. The column layout should always be determined by the room layout; while it might theoretically appear cheaper to arrive at the most economical column spacing and steel framing and fit the room partitions to them, the consequent juggling of partitions, furring and lack of uniformity in room sizes, finish, etc., more than offset any saving. Column spacing will vary therefore from 16 to 24 feet on centers and beam spacing from 5 to 8 feet, depending on the standard room.

In the construction of the Statler and other hotels with which the writer has been identified, 22 feet 6 inches has been generally adopted as the long dimension of the bay. The girders are run the length of the wing, which permits them to be hidden by the partitions between bathrooms and sleeping rooms or to pass over the bathrooms and foyers when they are concealed by furring down these small areas of ceiling. This scheme leaves the room ceiling free of projecting girders and the smaller steel floor beams which run lengthwise of the rooms can with little trouble be arranged at the partitions and in the centers of the rooms. On an irregularly shaped lot this, of course, cannot be worked out so easily, and in that case a suspended ceiling is generally necessary. In New York the building code permits the clear ceiling height to be figured to the



Typical Guest Room Unit designed for span of 22 feet 6 inches, with girders running lengthwise of the wing

Geo. B. Post & Sons, Architects

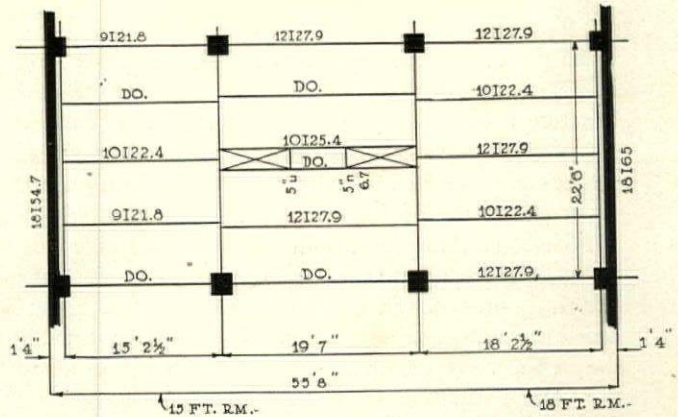


under side of the floor slab, so that in a given height more floors can be accommodated with the ceiling beams exposed than if a suspended ceiling were built to conceal them. The better appearance that a flat ceiling presents, however, makes it desirable, when the extra expense can be justified to erect a suspended plaster ceiling carried by metal lath attached to furring channels clipped to the underside of the beams. This, obviously, adds to the dead weight, and the steel must be designed proportionately heavier; the approximate weight of a suspended ceiling is from 8 to 10 pounds per square foot.

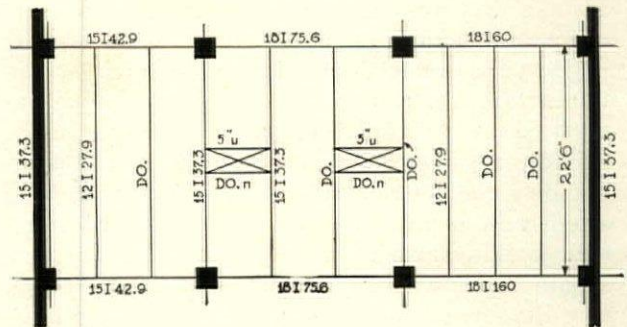
Another method of floor framing is to run the girders across the wing; this has a certain advantage in stiffening the frame and reducing the amount of steel required for wind bracing; but it brings the projection of the girders into the rooms, and the partitions cannot be made to line with the beams, resulting in a ceiling that is not in keeping with a first-class hotel. There is reproduced herewith a standard double unit, giving the finished appearance of the rooms with girders running lengthwise of the wing and the floor beams arranged with regard to position of partitions. Accompanying it are steel framing diagrams of a wing 55 feet 8 inches wide which provides rooms 15 and 18 feet in depth respectively on opposite sides of the corridor. The column spacing in each case is the same; the weight of steel in Scheme A, with girders running longitudinally, is 11.2 pounds per square foot, and in Scheme B, with girders running transversely, is 10.6 pounds per square foot. The advantages of Scheme A as enumerated are sufficient, however, to justify its choice in most instances.

This weight of steel provides for dead and live loads, but does not take into consideration steel required for wind bracing. There are many different paths over which the wind loads may be assumed to travel in reaching the foundations, and the choice of the members to be utilized in carrying the wind load will depend on the conditions to be met in the particular problem one has at hand. By selecting such bays in each wing in which the column spacing is continuous from the top of building to the basement for carrying the wind load, but slight additional steel is necessary. The greatest economy in steel is offered by the method of taking the wind loads directly into each bent of columns running parallel to the direction of the wind, since it is often found that the columns and beams as designed for dead and live load stresses are large enough to carry the wind stresses. This is especially true where the girders in the floor system run parallel to the direction of the wind. The wider the wings are, the less wind bracing will be required.

Live floor loads vary, of course, with local building ordinances. Guest rooms vary from 40 pounds (in New York) to 60 pounds; some cities require as high as 75 pounds for corridors and 120 pounds for ball rooms. Safe and recommended practice is



Scheme A. Steel framing with girders running lengthwise of wing. Weight, 11.2 pounds



Scheme B. Steel framing with girders running across the wing. Weight, 10.6 pounds per square foot

40 pounds per square foot for guest room floors and corridors and 100 pounds for the public portions.

One hope of lower construction costs lies in standardizing building codes in such details as floor loads so that unnecessary material is not required, and also in obtaining general recognition of higher tensile stresses in steel. The American Institute of Steel Construction, which represents 90 per cent of all steel fabricators throughout the country, has adopted a new structural steel specification prepared by a group of leading engineers in which the allowable unit stress in bending has been increased to 18,000 pounds per square inch of net cross section. The general adoption of this specification would save large sums in cities where the present allowable stresses are much lower, and in those sections where no ordinances exist, it would provide a standard basis for comparative estimates.

Interior partitions constitute an element of importance today, both from a standpoint of floor space occupied and dead weight. The usual partition is of 3-inch hollow tile or gypsum block plastered on both sides, the choice generally depending on market conditions at the time of placing the contract. In recent years interest has grown in the use of a solid plaster partition with a reinforced metal lath core. The advantages claimed for this are a saving of floor space, since it is only 2 inches thick compared with 4 inches for other partitions, and a saving in steel because of its lighter weight. It requires the use of special electrical outlets and fittings that will finish flush with the walls. In order



to effect the saving in steel it is necessary to settle upon the use of the thin partition at the outset; this is not always practicable, and as a matter of safe practice it is well to figure the steel to take care of the heaviest partition that may be decided upon; 25 pounds per square foot is sufficient. Elevator shaft walls should be of 6-inch block.

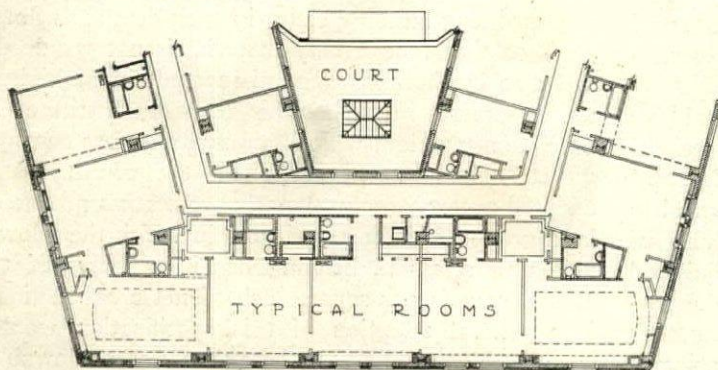
Special framing requirements are found in hotels, due to differences of span in the typical and public floors. Construction difficulties can be greatly lessened through careful planning. In all cases possible the public rooms should be placed with reference to the typical column spacing; their widths should conform to the widths of the typical wings, in which case a clear span can be arranged with trusses 12 to 14 feet deep concealed in the partitions above to carry the weight of the upper floors. The members of the truss are so designed that the corridor continues through, and such other clear openings as required may be made. When the clear span of the public room is greater than the width of the wing, not only the interior columns but the court wall also have to be carried on the trusses, and this situation should be avoided whenever possible. An ideal solution from a structural viewpoint is seen in the new Roosevelt Hotel in New York where the large ball room is placed directly under the court roof, requiring framing only heavy enough for the roof.

The column spacing established on the main floors because of public room sizes should be carried through the basement and sub-basement. This will

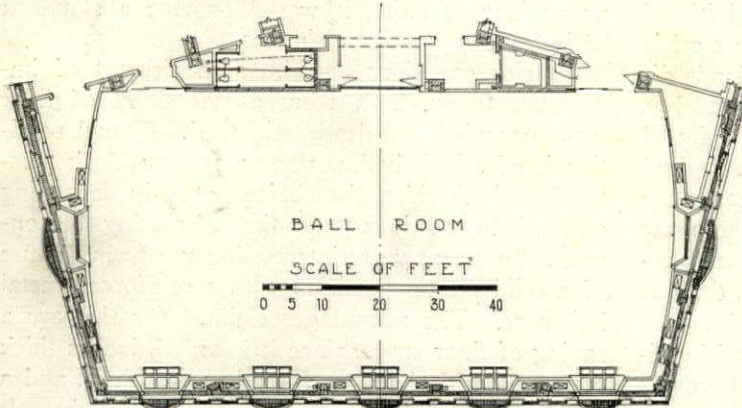
give sufficient space free of columns to accommodate easily the large equipment of engine and boiler rooms, laundry and kitchen.

Careful provision should be made to insure adequate shafts for the large mass of piping and wiring required in a modern hotel. The standard practice of grouping two inside bathrooms about a common shaft meets this requirement in adequate fashion for vertical space. Sufficient horizontal space can also be arranged by furring the ceilings of bathrooms and entrance foyers. It should never be necessary to raise the floor level of the bathroom to accommodate piping. When radiators are placed below the windows on the side of the room opposite the bathroom the risers are furred in, and the horizontal lines are run in chases cut out of the exterior wall. Roof conductors can also easily be accommodated in the bathroom shafts.

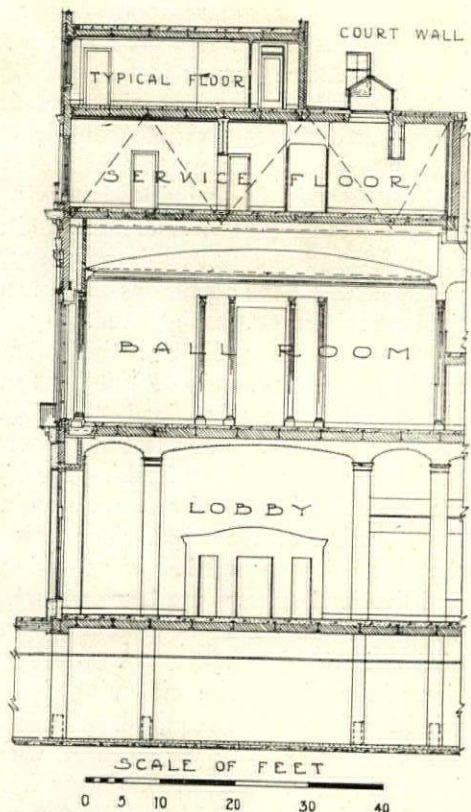
The various structural details of a hotel should be designed with the idea of minimizing maintenance cost constantly in mind. Shower baths should be carefully waterproofed, and the iron door bucks now commonly used should be protected at the floor level of bathrooms with tile plinths. This will prevent corrosion from contact with water that is apt to lie on the floor occasionally. Corridor floors, walls, door and window trim should all be selected to provide long service. It is distinctly economical to use metal window sash and frames, metal baseboards in the rooms, and the very best grade of hard finish plaster obtainable.



Typical Column Spacing, room floor over ball room



Floor Plan of Ball Room showing column spacing below guest room floor



Section showing lower floor columns and ball room truss

Hotel Statler, Detroit  
Geo. B. Post & Sons, Architects



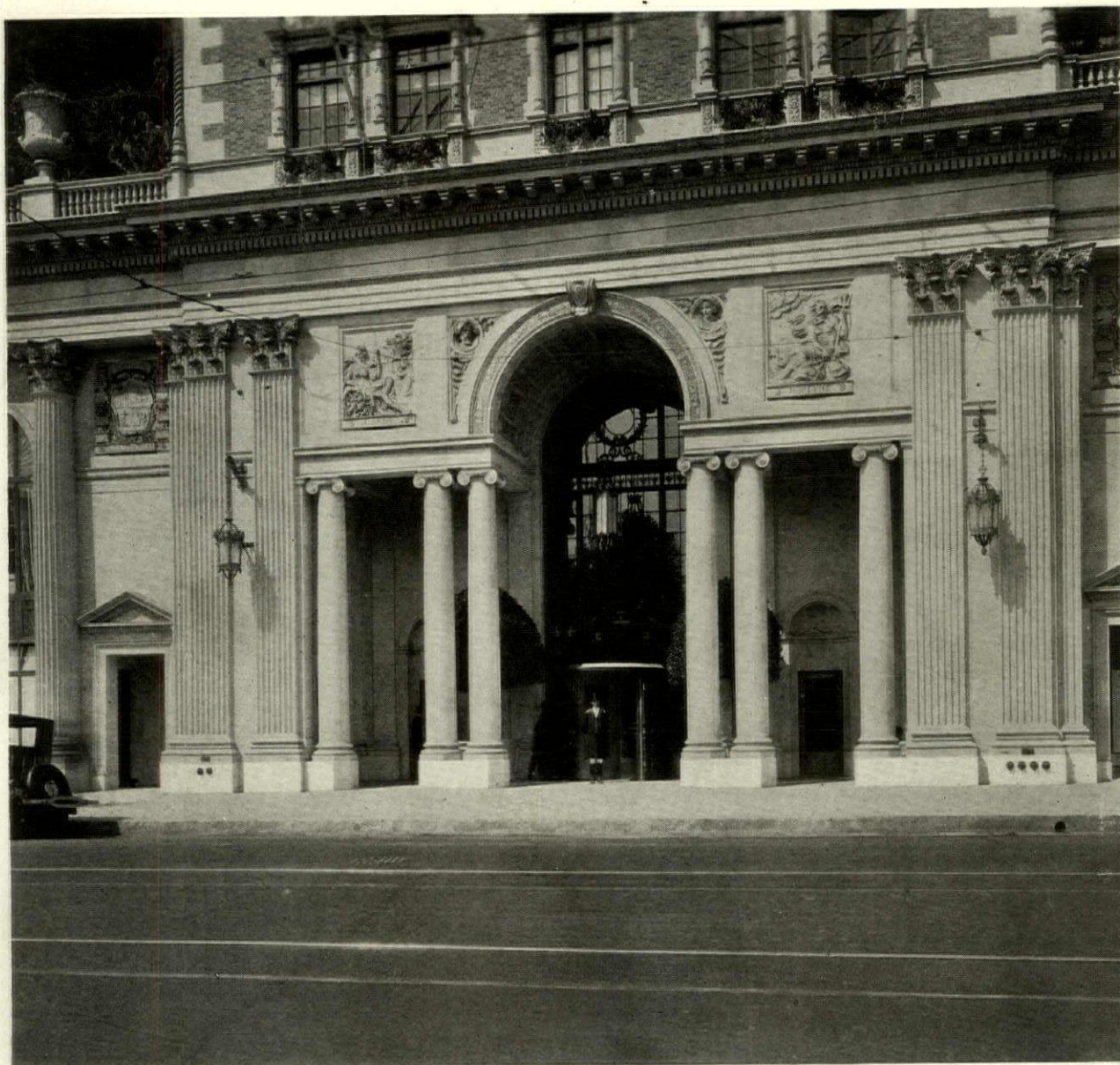


GENERAL VIEWS OF EXTERIOR  
LOS ANGELES-BILTMORE HOTEL, LOS ANGELES  
SCHULTZE & WEAVER, ARCHITECTS

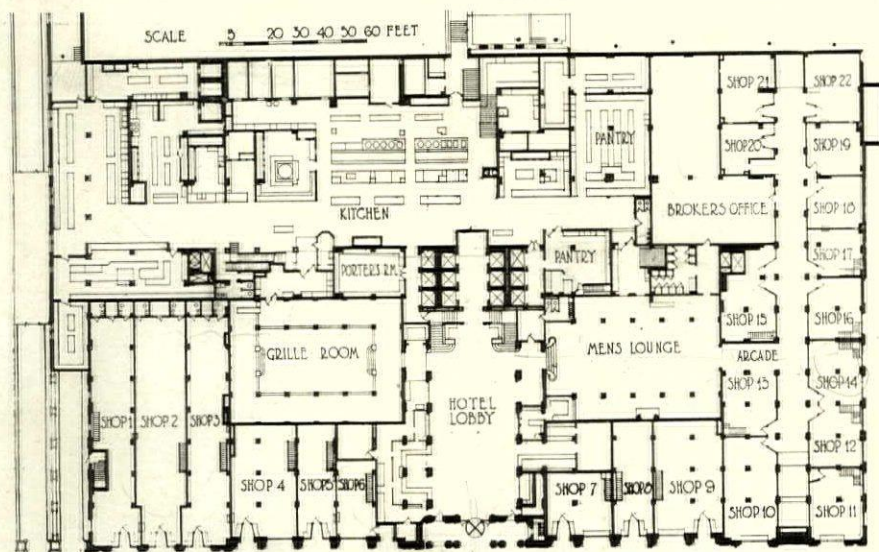








DETAIL OF MAIN ENTRANCE



GROUND FLOOR PLAN

LOS ANGELES-BILTMORE HOTEL, LOS ANGELES  
SCHULTZE & WEAVER, ARCHITECTS

This building is the largest hotel west of Chicago, and in the spaciousness of public rooms excels any hotel in the country. There are 916 guest rooms and 826 bath rooms. The total dining capacity, including private dining rooms, is 2500; the ball room accommodates 650 people. These rooms are served by two kitchens and five serving pantries.

The construction is fire-proof, of steel frame with reinforced concrete floors. The exterior materials are granite and limestone on the lower stories and light red brick with terra cotta trim above.









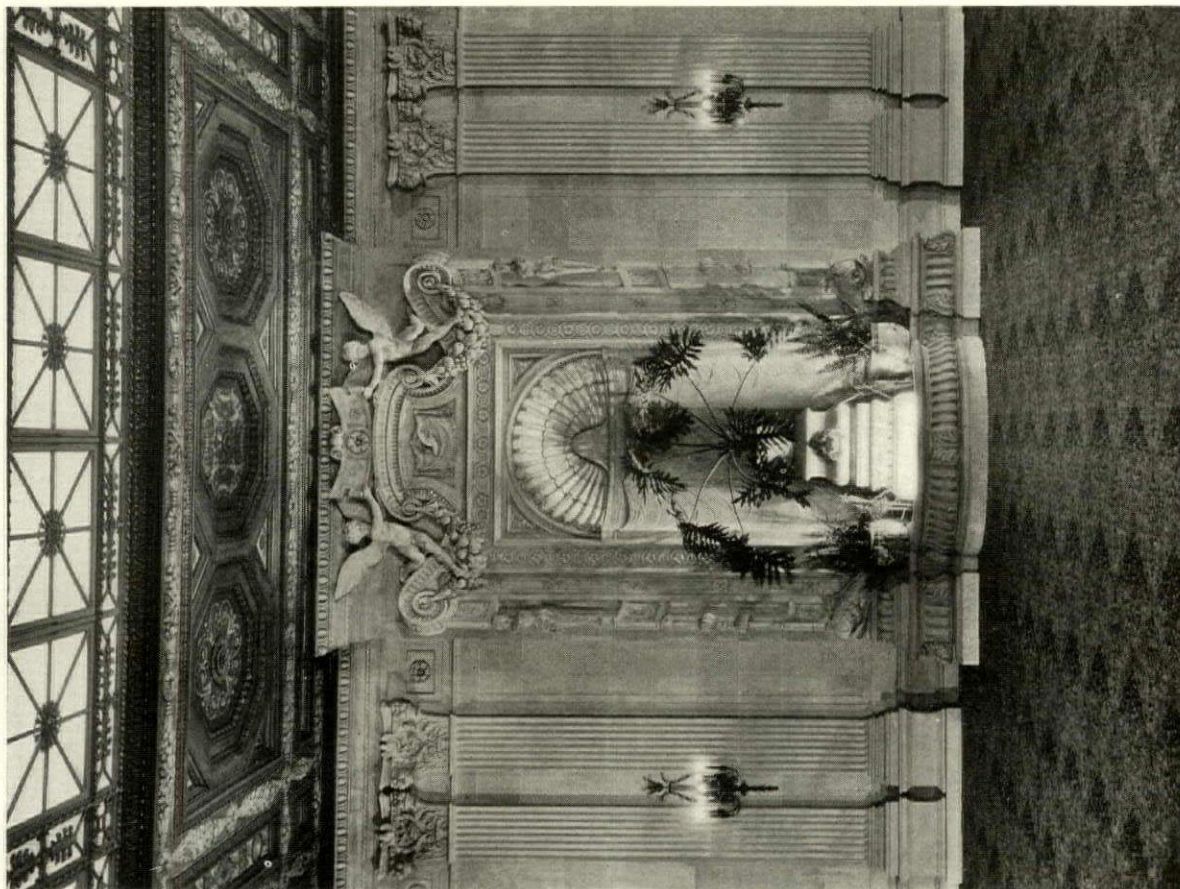
*Los Angeles-Biltmore  
Hotel Photos. © by  
Keystone Photo.*

MAIN DINING ROOM  
LOS ANGELES-BILTMORE HOTEL, LOS ANGELES  
SCHULTZE & WEAVER, ARCHITECTS



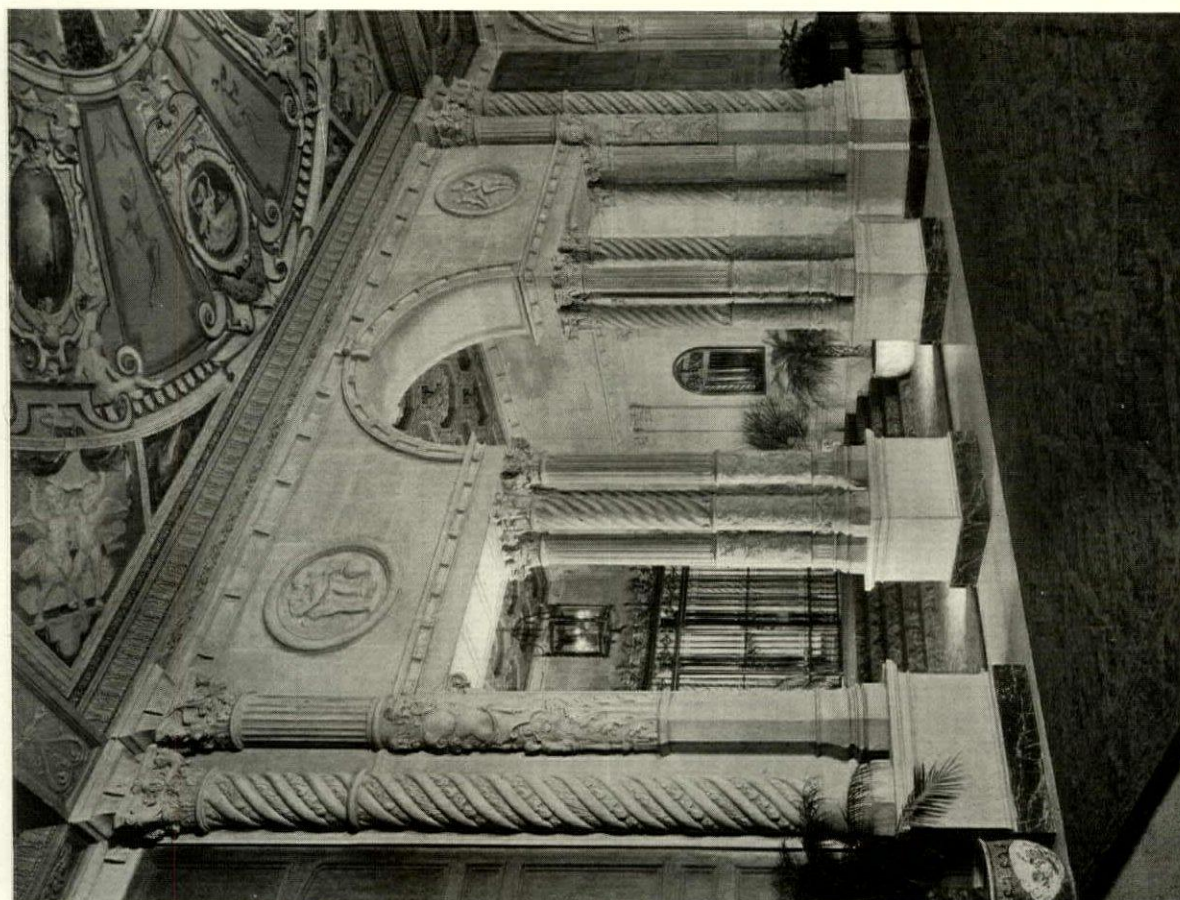






WALL FOUNTAIN IN LONG GALLERY

LOS ANGELES-BILTMORE HOTEL, LOS ANGELES  
SCHULTZE & WEAVER, ARCHITECTS



LONG GALLERY ENTRANCE TO BALL ROOM



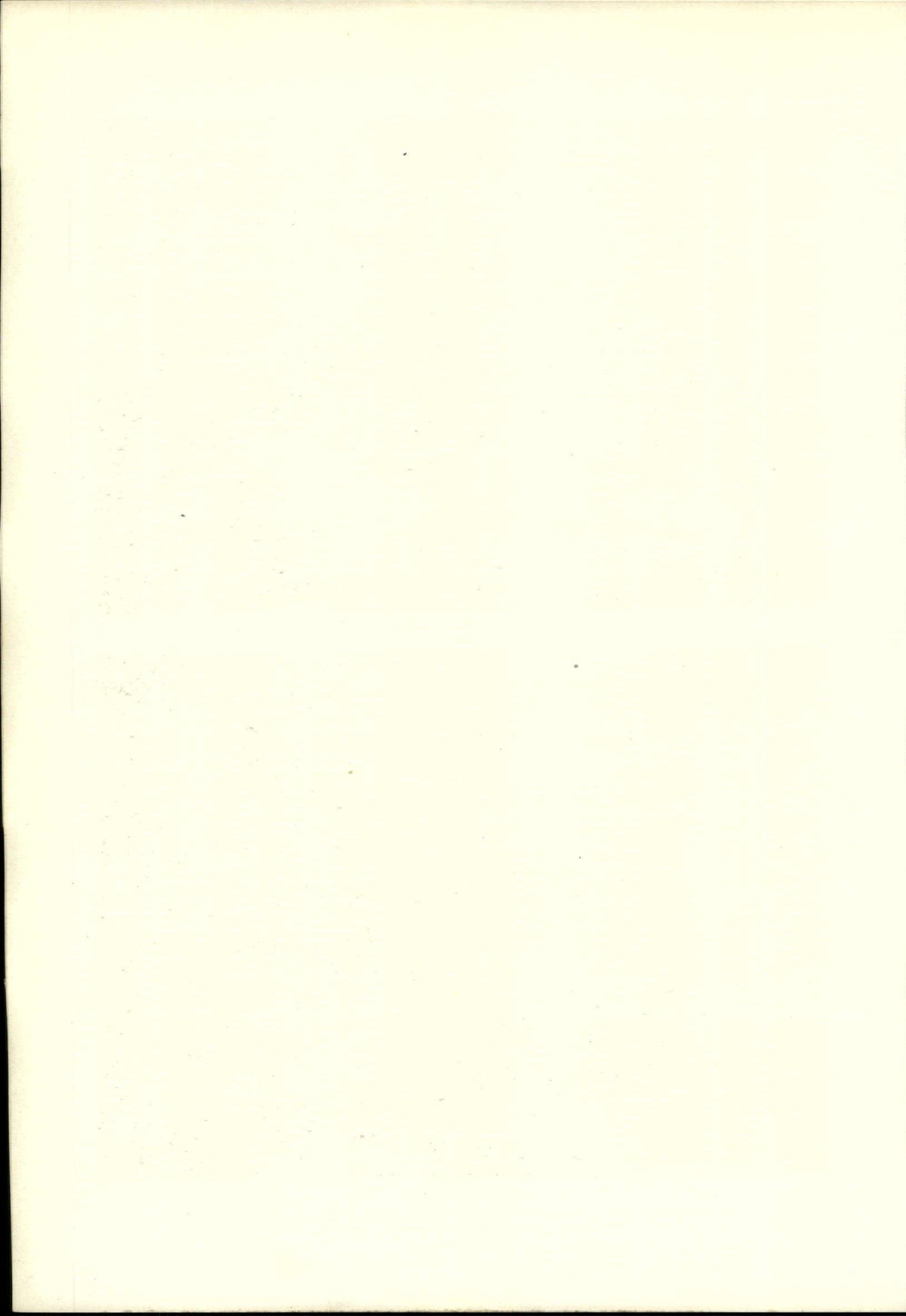






DETAIL OF BALL ROOM  
LOS ANGELES-BILTMORE HOTEL, LOS ANGELES  
SCHULTZE & WEAVER, ARCHITECTS









MEN'S GRILL ROOM ON GROUND FLOOR



THE LONG GALLERY  
LOS ANGELES-BILTMORE HOTEL, LOS ANGELES  
SCHULTZE & WEAVER, ARCHITECTS









SUPPER ROOM LOOKING INTO PALM ROOM

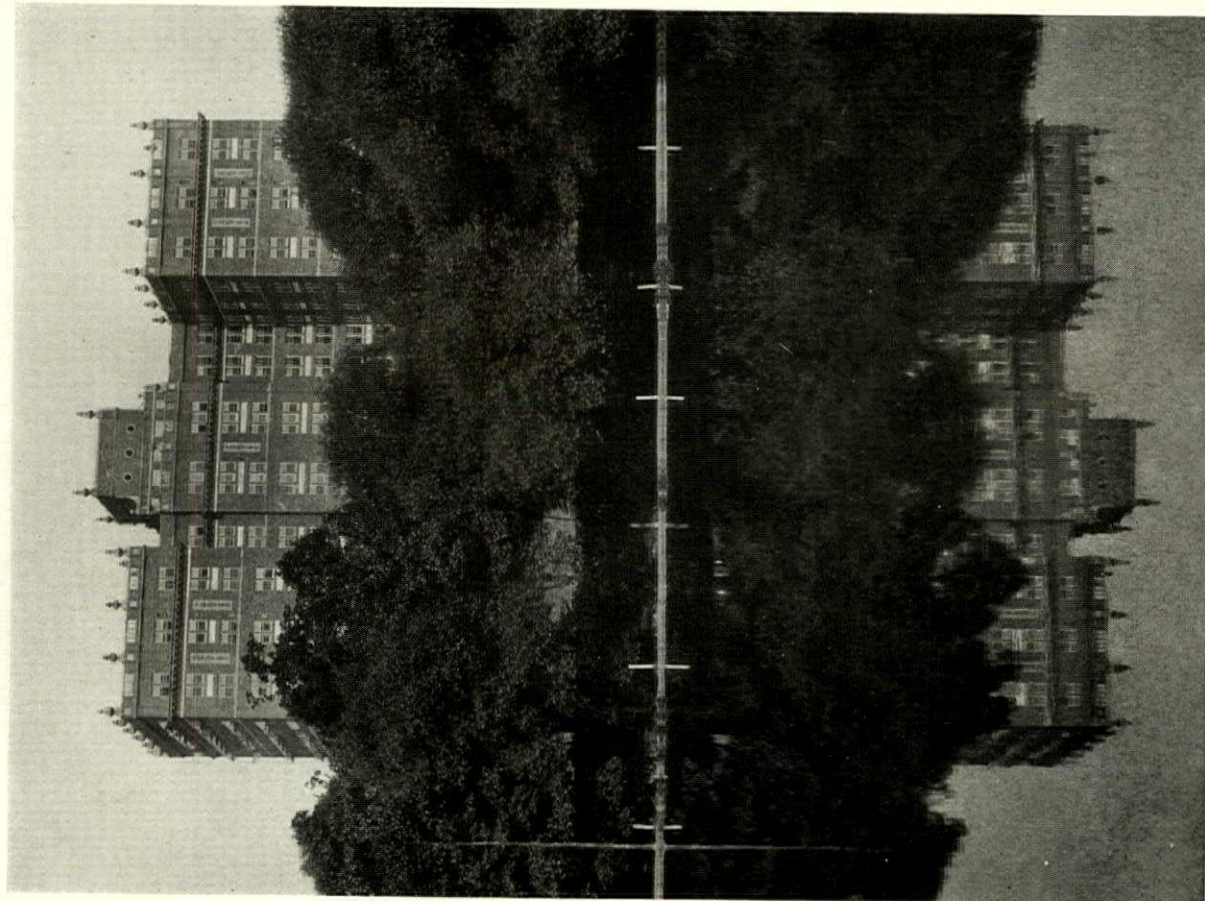


FOYER OF BALL ROOM  
LOS ANGELES-BILTMORE HOTEL, LOS ANGELES  
SCHULTZE & WEAVER, ARCHITECTS



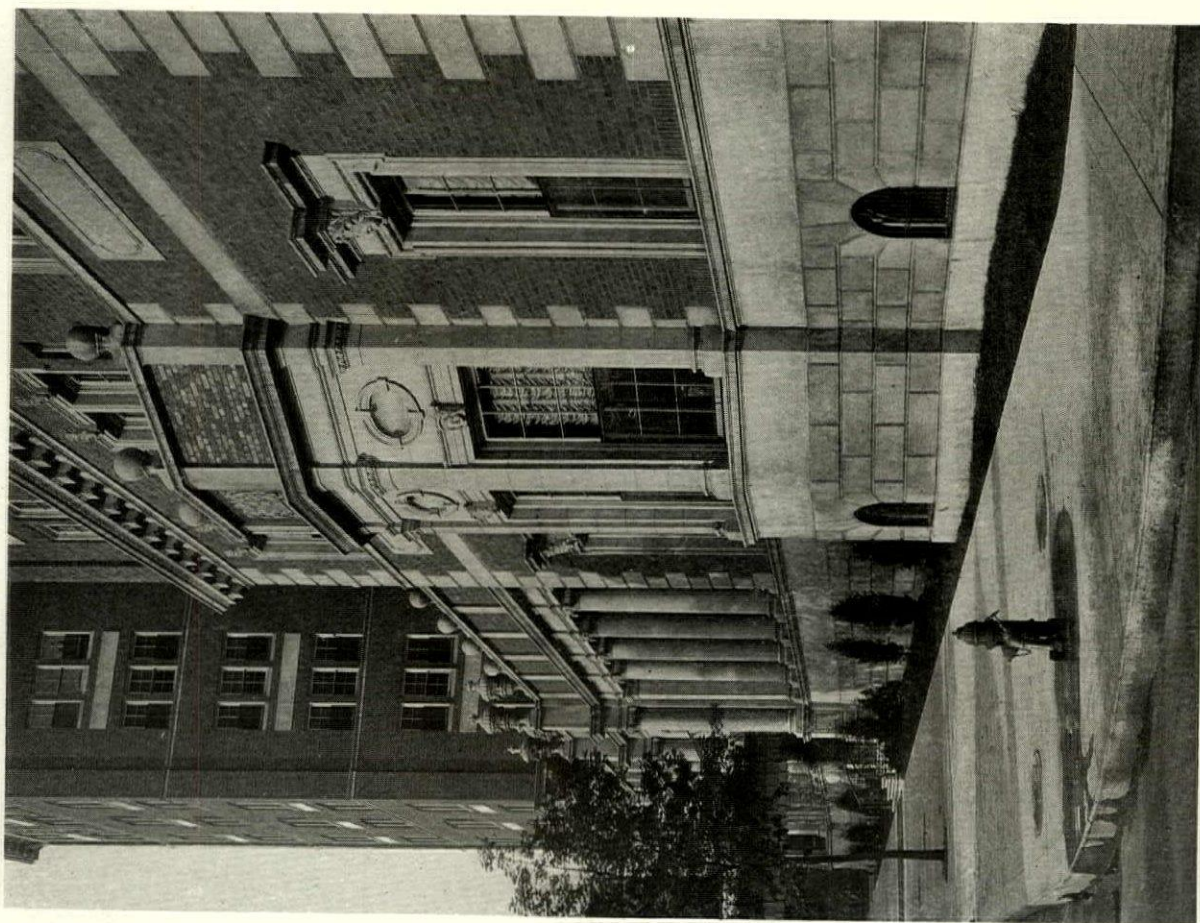






GENERAL VIEW ACROSS LAKE

WADE PARK MANOR HOTEL, CLEVELAND  
GEO. B. POST & SONS, ARCHITECTS



DETAIL OF ENTRANCE FRONT

*Photos, Schuyler Carteret Lee*

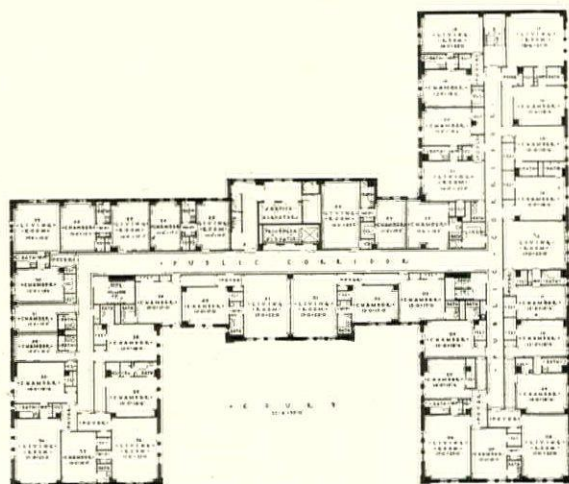


WADE PARK MANOR HOTEL,  
CLEVELAND

Illustrations on Plates 80-84

This hotel is of residential type, with 400 guest rooms and 260 baths grouped in small suites. The main dining room seats 262, and a private dining room 41; the ball room accommodates 220. There is a main kitchen with a banquet pantry and help's cafeteria. An unusual feature is the warming pantry with each suite. They are equipped with sinks and duplex electric outlets to meet light cooking requirements; no ice provisions are made.

The construction is steel frame with metal joists; the exterior is finished in red brick and terra cotta. Power is from central station service, and heating by two-pipe vacuum return system. Mechanical equipment includes supply and exhaust in public and service rooms; air washing on supply systems; refrigerating plant; water-softening apparatus and vacuum cleaning. The building contains 3,316,500 cubic feet, and was completed in March, 1923.

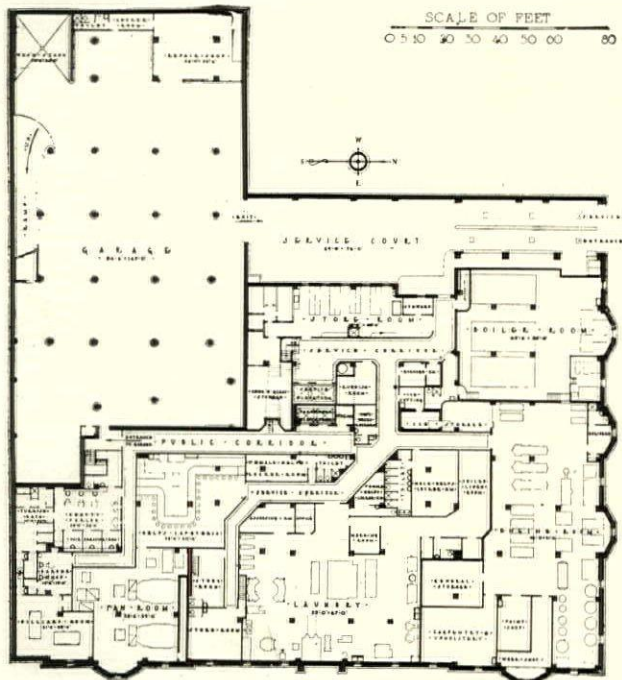


TYPICAL FLOOR PLAN

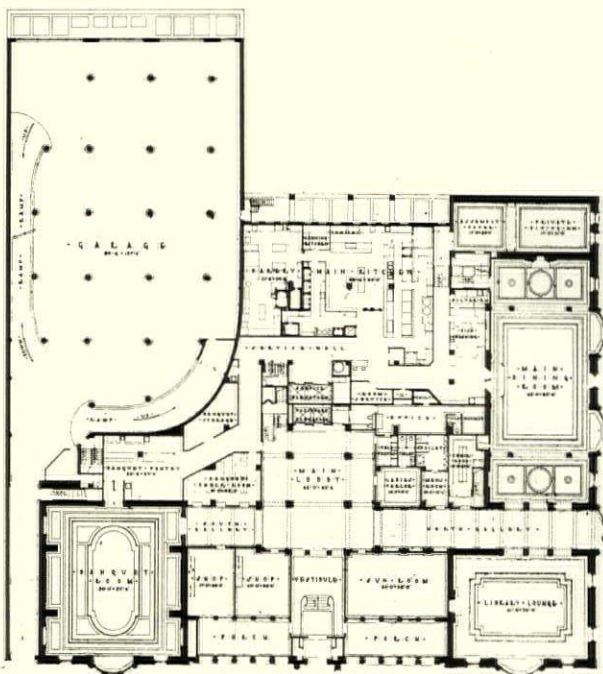




DETAIL OF ENTRANCE



BASEMENT FLOOR PLAN



FIRST FLOOR PLAN

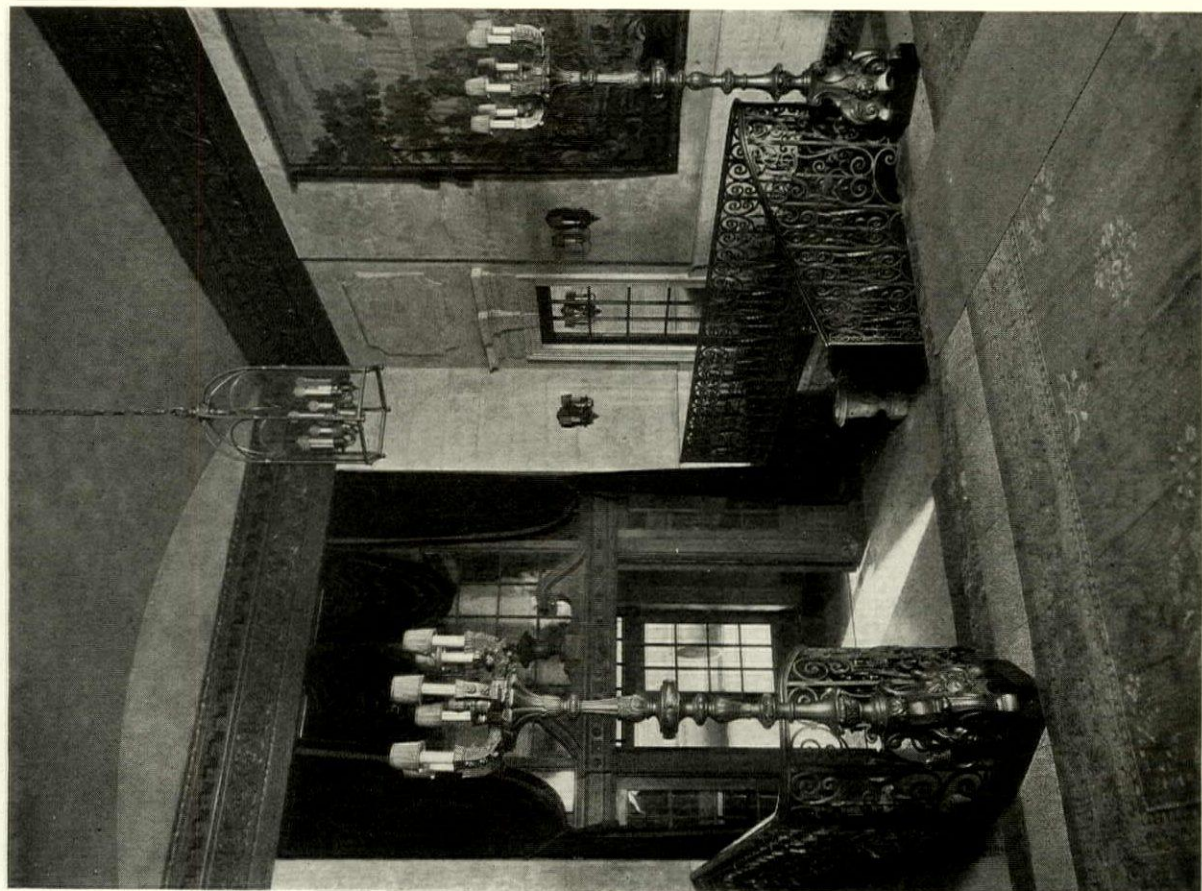
WADE PARK MANOR HOTEL, CLEVELAND

GEO. B. POST & SONS, ARCHITECTS



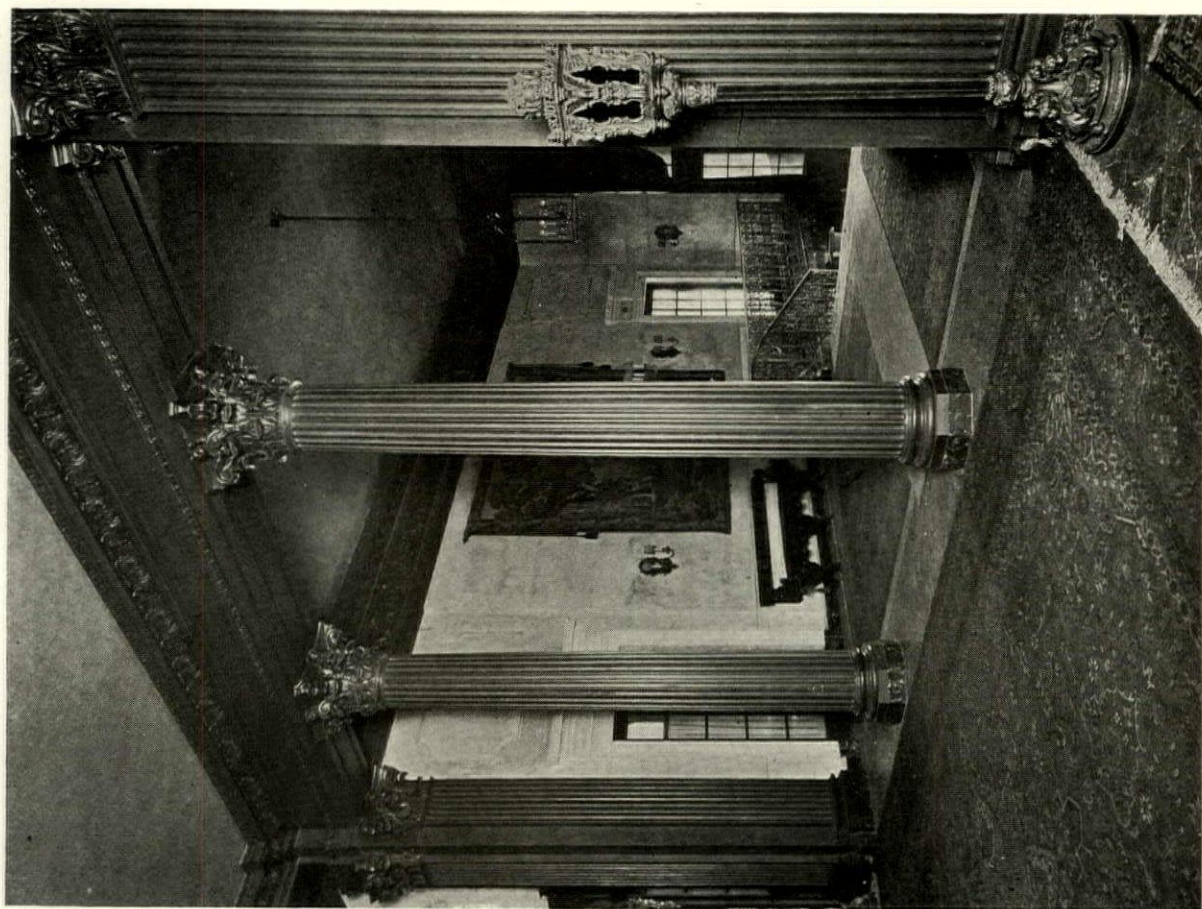






ENTRANCE VESTIBULE

WADE PARK MANOR HOTEL, CLEVELAND  
GEO. B. POST & SONS, ARCHITECTS

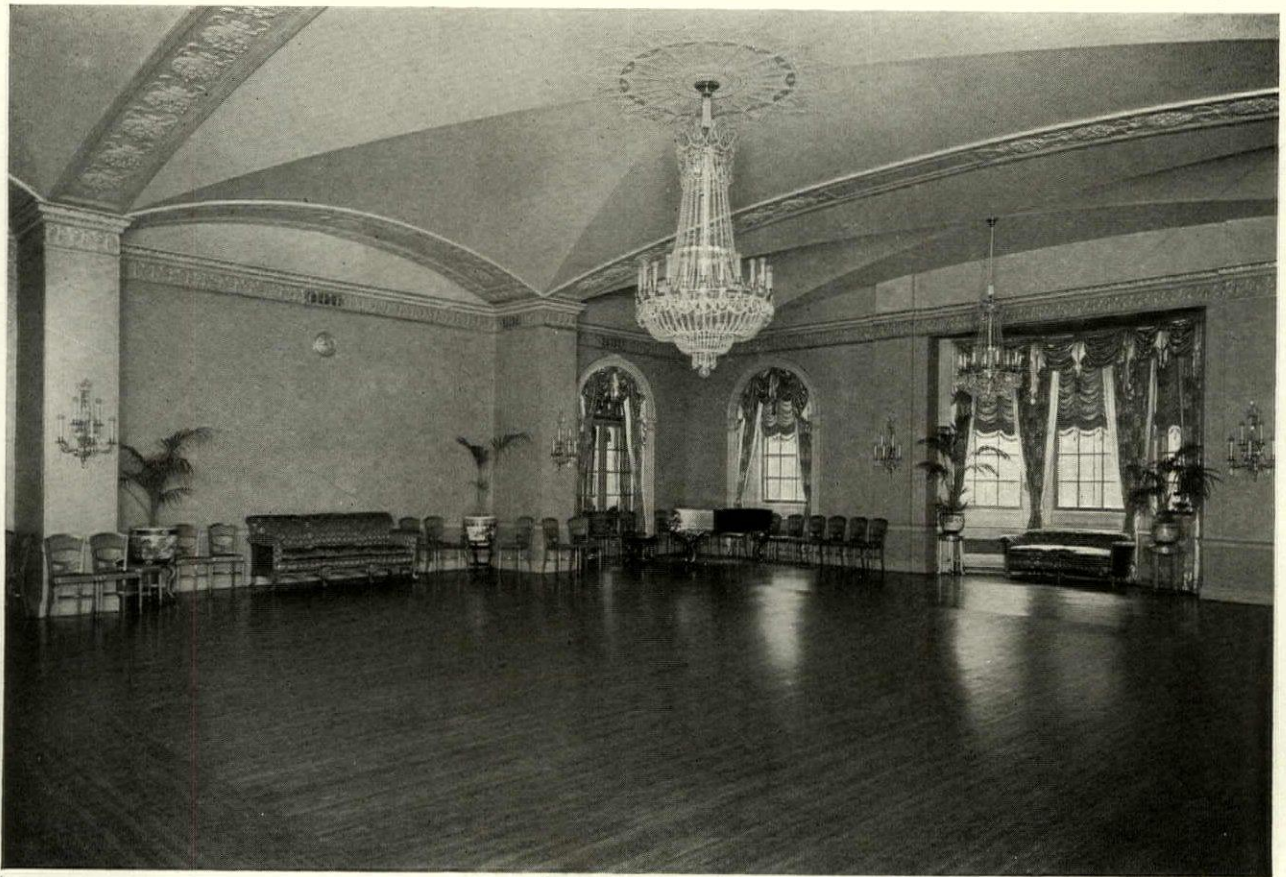


MAIN LOBBY TOWARD ENTRANCE









BALL ROOM



MAIN DINING ROOM

WADE PARK MANOR HOTEL, CLEVELAND  
GEO. B. POST & SONS, ARCHITECTS



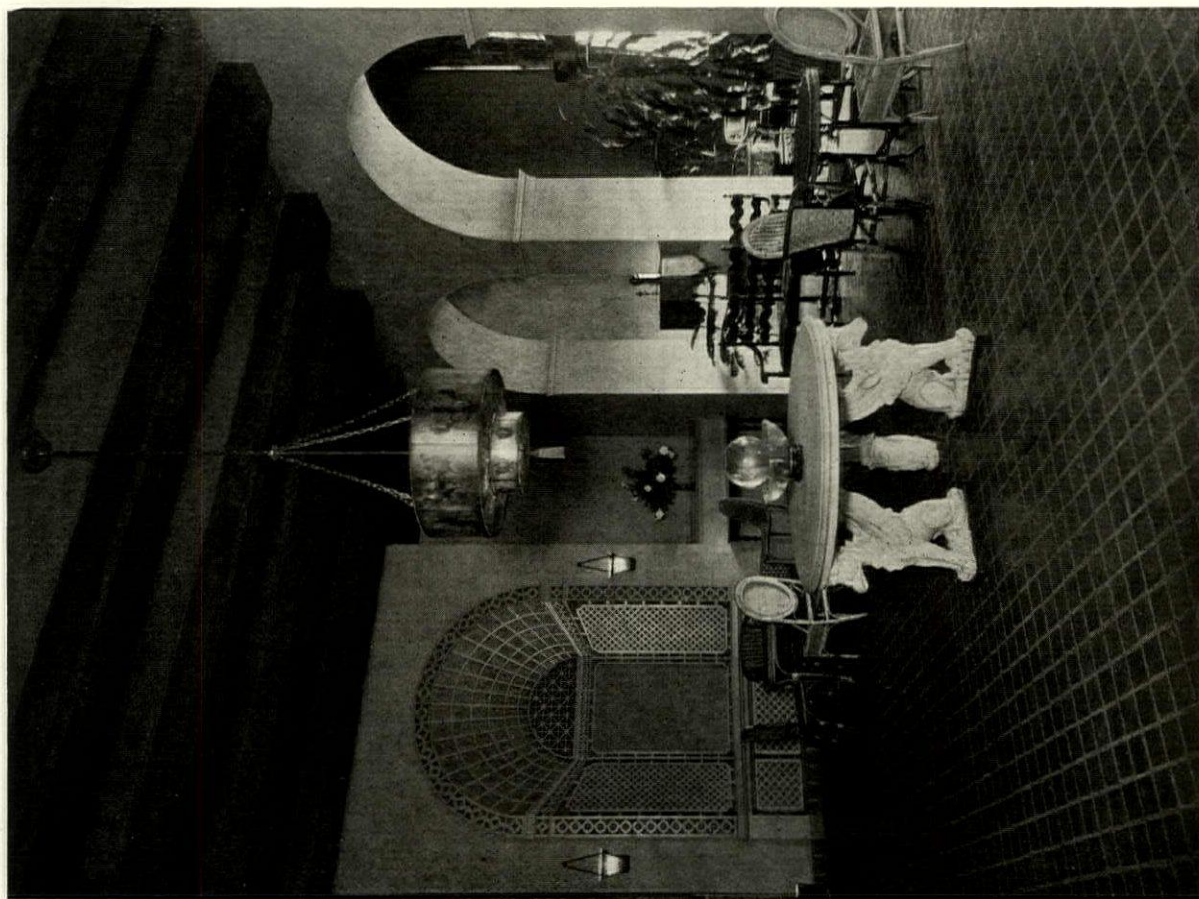






LOUNGE LOBBY

WADE PARK MANOR HOTEL, CLEVELAND  
GEO. B. POST & SONS, ARCHITECTS



TEA ROOM







# The Planning and Equipment of Hotel Kitchens

By ALBERT E. MERRILL,  
Equipment Engineer, Chicago

SO wide a variation exists in the requirements of the same sized hotels, so far as the kitchen equipment is concerned, that it is very difficult to give any general rule which will apply to all conditions. The general obstacle which the equipment engineer has to overcome is limited space, and it may be safely assumed that 75 per cent of the present kitchen space is too small, and that a great saving in labor, wastage and loss of patronage could be effected by giving suitable consideration to this important department of hotel operation.

In this article we will consider the plants of three representative hotels, from the modern apartment hotel proposition, where the kitchen requirements are generally the least, to the modern metropolitan hotel catering especially to banquets and special service, where the kitchen space must be the largest. The reproduction of the kitchen perspective plan of the Drake Hotel, Chicago, Marshall & Fox, architects (Fig. 1), is an example of the latter class and one where neither amount of equipment nor space requirements have been slighted in any degree. It also illustrates the conditions which are often met in any large kitchen; that is, exits to dining room at opposite ends, ample room for service equipment, and space for banquet preparation. The arrangement is also typical in that the service portion forms a hollow square through the logical center of the room, with ample silver heaters, dish heaters and tray tables through the center aisle. On one side of this are banked the main dish heaters, cooks' tables and bain maries, back of which are the

ranges; on the opposite side are the cold counters, pastry counters and garde manger counters, backed up by preparation rooms for the various departments.

The ideal shape of any kitchen is as nearly square as possible, with the supplies entering from one side and gradually moving through the various departments to the service counters, where they are secured by the waiters. In the Drake kitchen we find a partition back of the ranges where the various refrigerators and work tables required for supplying short-order service are located, and at one end of this line is the short-order counter, where also are located the coffee urns and places for preparing toast, cakes, waffles and eggs. Still farther back we are met with the steaming room, supplied with vegetable preparation equipment, a large battery of soup kettles, pot roasters, and two large sectional steamers. At one end of this room is the pot washing department. On the opposite side of the hollow square we find directly back of the pastry counter a large ice cream storage cabinet in which can be stored some twenty varieties of ice cream in plain and fancy form. Still farther back from this room is the bake shop, which is divided into two distinct departments, one for making bread and rolls and the other for preparing French pastry. Back of the cold meat counter are the various meat choppers, slicers and other equipment required. Directly back of the salad preparation counter we find a large refrigerator which extends also behind the cold meat counter and supplies all the necessary finished prod-

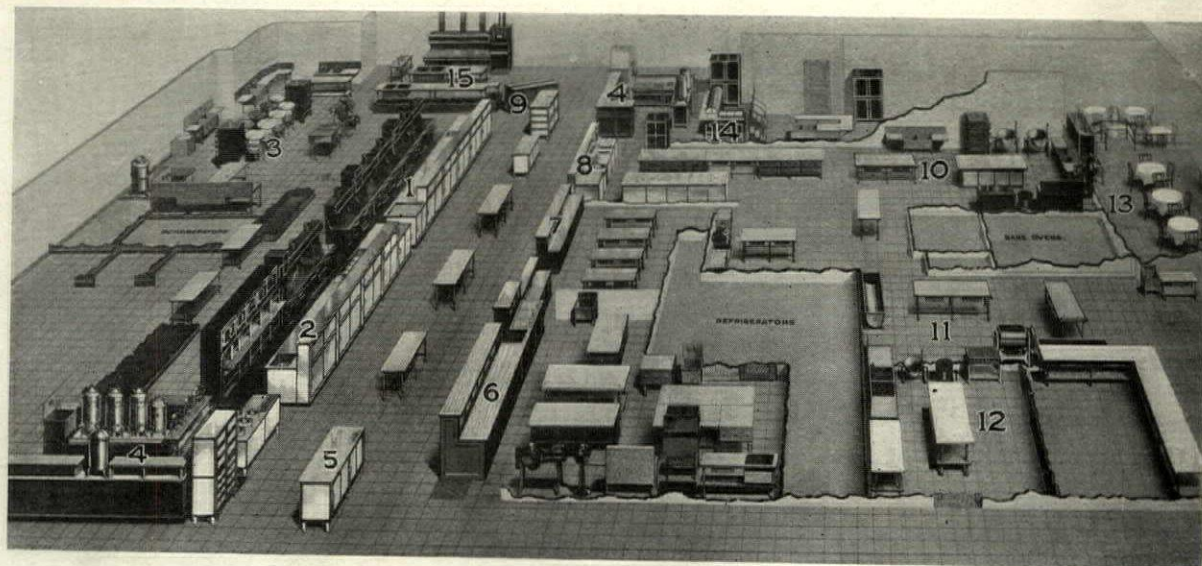


Fig. 1. Perspective Plan of Kitchen in the Drake Hotel, Chicago  
Marshall & Fox, Architects

- |                                     |                               |  |
|-------------------------------------|-------------------------------|--|
| 1. Range section                    | 6. Garde manger               | 11. Bake shop, bread section                   |
| 2. Broiler section                  | 7. Fruit pantry               | 12. Confectionery section                      |
| 3. Vegetable preparation department | 8. Ice cream pantry           | 13. Dining rooms for officers                  |
| 4. Coffee pantries                  | 9. Checker's desk             | 14. Cafeteria for guests' maids and chauffeurs |
| 5. Dish and silver heater           | 10. Bake shop, pastry section | 15. Help's kitchen                             |





General View, Kitchen of the Sheridan Plaza Hotel, Chicago  
W. W. Ahlschlager, Architect

ucts for both of these very important departments.

To the right of the service department is located the dish and silver cleaning room. Conveyers carry the baskets of soiled and clean dishes to and from the various dining rooms. In front of this department is the service bar for cold drinks, which is not as large or as much used as in previous years. In one corner of the room we find the main storage refrigerator, which in this case is divided into eight compartments, with a large vestibule opening between them. On the opposite side of the wall from this is the main storeroom, a veritable grocery store, where all goods are delivered, and after being properly weighed are stored in bins or, if of a perishable nature, are carried directly to the storage refrigerator.

Quite in contrast to the Drake kitchens, where we find a total kitchen space of approximately 30,000 square feet, there is shown a plan (Fig. 2) of the kitchen of the Sheridan Plaza Hotel, Chicago, W. W. Ahlschlager, architect, which occupies less

than 10,000 square feet, exclusive of the storeroom and storage refrigerators, which are located on the floor below. Here the shape of the room dictated an entirely different scheme of arrangement and made it impossible to locate the preparation departments directly back of the service departments. Consequently, we find the steamer room in one corner and the vegetable preparation, poultry, ice cream and bake shops at the opposite end. In each of these kitchens all departments required for a first-class service are represented, yet the space requirement, in the case of the Sheridan Plaza, is less than one-third of that devoted to the same purpose at the Drake. The sizes of the hotels, as far as number of rooms is concerned,

are not essentially different, but the Drake caters to service dining rooms, having a total seating capacity of 750 and numerous banquet rooms, which are used nightly, and which have a combined seating capacity of over 1,500; while at the Sheridan Plaza the main dining room seats about 300, a cafeteria approximately the same number, and one banquet room also about 300.

The third plan (Fig. 3), of the kitchen of the Wade Park Manor, in Cleveland, George B. Post & Sons, architects, exemplifies the modern apartment hotel of approximately 500 rooms, with a single dining room seating about 200 and a small banquet room accommodating about 250. This kitchen occupies a floor space of about 10,000 square feet and, the shape being more nearly in the form of a square, allows to a certain extent the location of a preparation department back of each service department.

A study of the three plans, all representing efficient kitchen installations, and for hotels of approximately the same size, will evidence the fact that general rules as to space requirements and location of equipment are subject to wide variation and depend upon the class of business to which a hotel caters and to

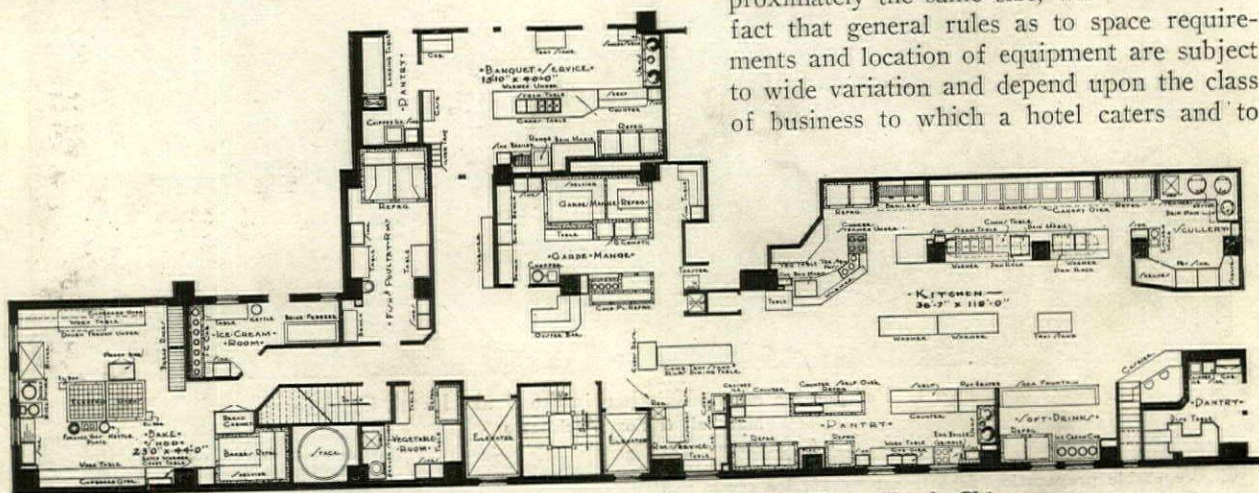


Fig. 2. Floor Plan of the Kitchen of the Sheridan Plaza Hotel, Chicago  
W. W. Ahlschlager, Architect



the knowledge and experience of the operator. A general consistency, however, does exist, and in the statements which will follow, averages rather than actualities are made as their basis.

A hotel of 500-room capacity should have dining room space, exclusive of banquet room, approximating 10,000 square feet, giving a seating capacity of about 700 people. This dining room space may be either entirely of the service variety or it may include a cafeteria or a popular-priced coffee shop or lunch room. In addition to this space, all hotels must be provided with one or more large banquet rooms accommodating from 200 to 300 persons at a sitting.

In order to have the service prompt and efficient for this amount of dining room space it is necessary that at least  $1\frac{1}{2}$  square feet of kitchen be provided for each square foot of dining area, or in this instance, approximately 25,000 square feet, or an average of 50 square feet per hotel room for kitchen and dining room combined. In the Drake, however, the combined space has more nearly approached 100 square feet per room, and instances are common in smaller hotels featuring only their rooms where as little as 25 square feet per room has been allowed.

In the arrangement of the kitchen first consideration must be given to the supply entrance. This necessarily must be conveniently located to the main storeroom and storage refrigerator. In most instances these are located in basements, and supply elevators and broad stairways must lead directly to them and large scales be furnished to check the weights of all goods. The storage refrigerator should never have less than four compartments and a floor area of less than 500 square feet. Having determined the supply entrance, the next consideration should be given to having these supplies move forward to the various departments of preparation, then to service counters with the least possible retracing of steps. The kitchen proper, as already said, should be of the hollow square arrangement and fitted for right-hand service to the main dining room, if possible. The right-hand side should be supplied with a steam table, short order counter

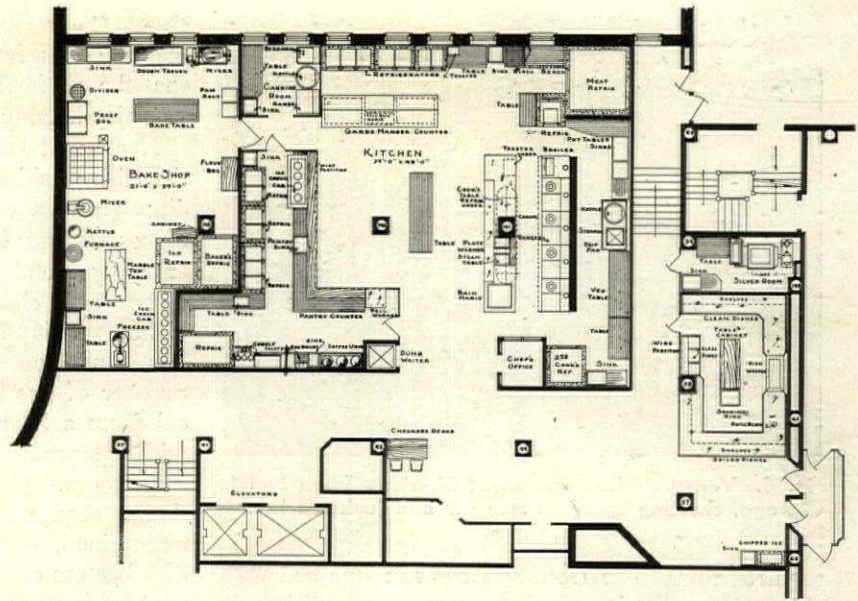
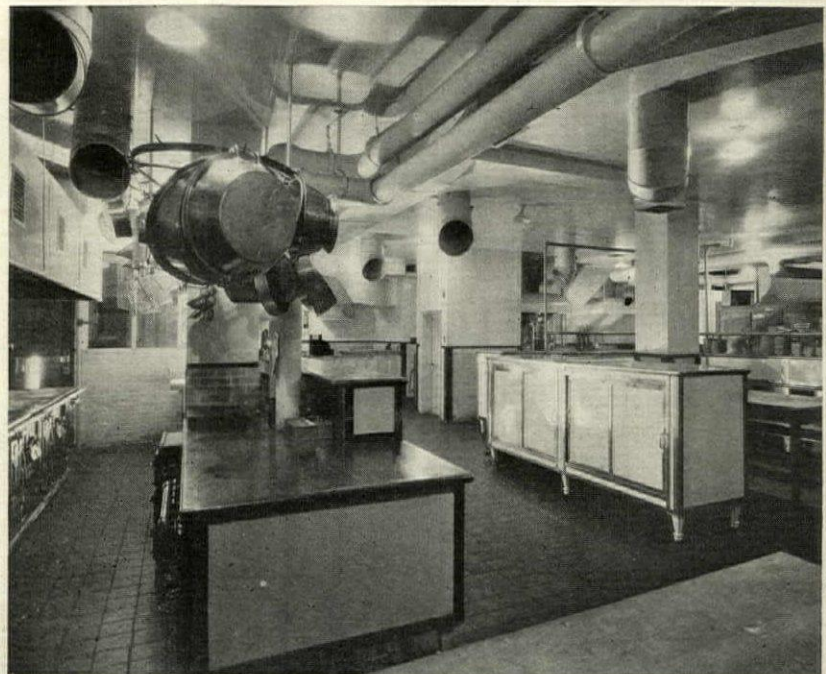


Fig. 3. Floor Plan of the Kitchen of Wade Park Manor Hotel, Cleveland  
Geo. B. Post & Sons, Architects

and pantry counter, while on the opposite side should be located the garde manger counter, pastry counter, soda fountain and checker's desk. Back of these stations, if possible, and if not, as closely located as the shape of the room will permit, are placed the preparation rooms for these various departments. The center of the room is provided with a series of dish heaters, silver heaters, a roll warmer or two, and all of them should be built of such height as to form a convenient tray rest. The fronts of all the service counters are to be built with the front section elevated about 15 inches above the level of the working space back of it, and the counters are either heated or refrigerated according to



View of the Kitchen, Wade Park Manor Hotel, Cleveland  
Geo. B. Post & Sons, Architects



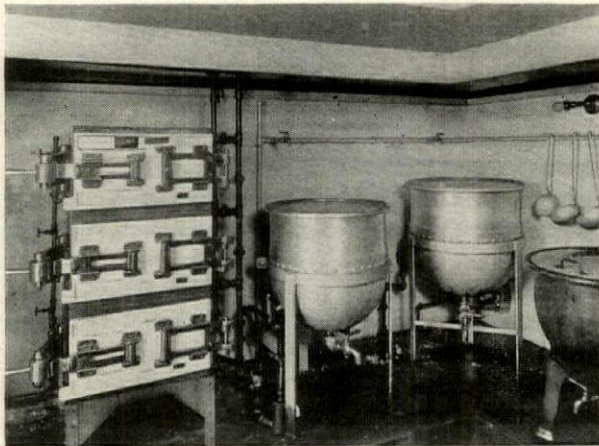


Fig. 6. Vegetable Department of Sheridan Plaza Hotel, Chicago, showing sectional steamer and jacketed kettles

requirements. The front sections are supplied with either lift or sliding doors to prevent the dishes or silver which they contain from becoming dusty, and the working space back of them is to be fitted with the various bain maries, steam tables, sinks, etc., that are necessary to keep the hot food hot and the chilled food cold. The cross section through the steam table (Fig. 9) indicates the manner in which these counters are built.

Nearly every kitchen must meet the requirements of dining rooms located in different directions and, consequently, extra steps are provided at opposite ends of the service counters and, as in the case of the Drake, double pantry counters. The aisle between the service counters must be made amply large to accommodate the number of waiters which the dining room will require. One waiter cannot profitably take care of more than three four-chair tables and, consequently, if the combined dining room space accommodates 600 persons, 50 waiters will be necessary, and at least half of them will be in the kitchen at one time. Where the dining rooms are not located on the same floor as the kitchen, service pantries adjacent to these dining rooms are necessitated, as otherwise the service would be entirely too slow.

In these service pantries there should be space for preparing short orders supplied with a short-order box, range and broiler, also a steam table and dish heater for entrees and a small pantry counter with coffee urns, all these arranged in the order already mentioned and, together with a checker's stand, located at the head of the stairs leading to the main kitchen. All entrances to the dining rooms

should be guarded by vestibules with double entrance doors for right- and left-hand entrance, so that the confusion and noise of the kitchen may not be objectionably noticed by the diners.

Nearly all large hotels find it profitable to have the dish-washing pantry for the entire number of dining rooms centrally located and to convey the dishes to and from this pantry by belt conveyers carrying metal dish baskets filled with the soiled dishes and cleaned and returned with the clean dishes. This serves a double purpose of creating less confusion in the kitchen by minimizing the number of bus boys, and also is far more economical from a help standpoint than would be the case with a separate dish pantry located conveniently to each room. One general exception to this rule is that a separate dish pantry for banquet dishes is maintained, and these dishes are kept in suitable dish heaters especially for that purpose and not mingled with the tableware of the main dining room.

All hotels must give consideration to room service, and again separate dish heaters and silver heaters are supplied and table space arranged so that set-ups may be made ready to be put on the elevator and carried to the floors where they are to be used. In very large hotels separate room service pantries are maintained on each floor for this purpose, but this is not a necessity in a 500-room hotel. Separate closets and heaters for this service are almost a necessity to keep a check on what is delivered and returned to avoid probable theft.

We will consider briefly the types of construction for each department and the various arrangements which prevail.

Refrigerators today are nearly all built of concrete and sheet cork. The walls should be of a total of 7 inches in thickness, including two thicknesses of 2-inch sheet corkboard laid in cork cement and covered on both sides with concrete surfaced



Fig. 7. Dish Washing Pantry of the Drake Hotel, Chicago, showing dish conveyers and dish washing machines



with cement. In the main storage refrigerator it is possible to have the coils hung directly on the walls of these boxes without baffle walls between them and the storage space, because as a general thing they are located away from the kitchen and are not opened as frequently as these boxes, and the liability for condensation on the provisions and walls of the box is thus minimized. However, if the boxes are located in the main kitchen, or if they are service refrigerators, it is necessary to build an insulated baffle wall between the coils and the storage space, if dry boxes and dry provisions are to be insured.

Very little consideration is given today to refrigeration by means of ice, as it is far more economical and vastly more cleanly to use artificial refrigeration. Both ammonia and carbon-dioxide plants are common, though probably the greater preference is given to ammonia for the reason that the work of compression is less, and these plants have now been developed to a point where the danger from leaking ammonia fumes is negligible. In many installations the main storage refrigerators only are built of cork and concrete and the service boxes are of the portable variety with wood exteriors and interiors. No consideration should be given to any refrigerator that is not insulated with sheet corkboard and of sufficient thickness to insure low temperatures.

The most important part of the cooking equipment is naturally the range, and a wide variation occurs as to the preferences on this piece of equipment. Only a few years back nothing was used except a coal range in 4-foot sections with a fire and oven in each section and of sufficient length to amply accommodate short-order and table d'hôte requirements. In recent years the convenience of gas has entirely revolutionized this condition, and nearly every kitchen today is supplied with gas ranges. The gas ranges belong to two distinct types, one with a series of injecting gas burners across the front and the other having four concentric ring burners for heating the range top. Range ovens are heated by two bar burners per section. There also are commonly used ranges built with a coal fire box but supplied with a gas burner in the fire box. Range tops may be either solid or perforated, but in hotel use little demand is made for other than the solid top.

In addition to gas and coal for fuel, large sections of the country have found oil possible, especially in the far west and southern sections where crude oil may be obtained at a very few cents per gallon. For the use of crude oil a motor and vaporizing burner are necessary. This equipment is required on each section of range and makes a comparatively expensive installation. However, there are now in use, satisfactorily, a large number of gravity feed burners which will only handle kerosene or distillate of a specific gravity of 38 or better, and this type of burner makes use of the principle of cooking the oil to a vaporizing temperature. The cost

of operation with these lighter burners runs between the cost of coal and gas, whereas the fuel oil burner is far less expensive to operate with than even the cheaper grades of coal.

With the development of large power stations throughout the country, electric ranges are coming more and more into demand. All classes of electric cooking equipment are now made available by both specialized manufacturers and the large equipment houses serving hotel needs.

A recent development of the electric range is encased with a non-corrosive metal and comes in 4-foot sections similar to standard gas ranges. These ranges have at least four separate heat controls for the top and two for the oven, each control being capable of three different heats. This gives an absolute heat control at all times, which may be rapidly changed as occasion may require, and it offers probably the finest cooking range that can be made. In order for the cost of operation to compare favorably with gas it is necessary that the current cost be not over 2 cents per kilowatt as compared with gas at \$1 per 1,000. Such power rates are generally offered by the large companies in the principal cities to induce customers to install this type of equipment.

Broilers (Fig. 8) are generally built for gas, with now and then a preference for charcoal and, as also with ranges, many installations of electric broilers. Most broilers are supplied with heating ovens above, further utilizing the heat of the burners below. Adjacent to these boilers must be a short-order box with all raw foods prepared ready for immediate use. No hotel should be furnished with less than two broilers, one to be used with fish and the other for meats. The entire range section, including broilers and steam tables in front, should be located under a built-in hood with carefully graduated openings and perfectly balanced to insure a uniform change of air at all points. Otherwise the intense heat of the ranges becomes unbearable, and it is impossible to keep people working in front of them.

Next in importance to the range section comes that of vegetable preparation (Fig. 6). Here we find a peeler, generally built with walls and disc of a mixture of concrete and quartz, effecting the peeling by the rapid rotation of the disc throwing the vegetable against the rough side of the cylinder. From the peelers the vegetables are sent in steaming baskets and cooked in sectional steamers, and from the steamer are placed in a mixing machine which mashes and creams them. The steamers are built either of cast iron or (preferably) of heavy boiler plate and are supplied with two or more compartments, each separately trapped and vented to insure no mingling of odors. Live steam is admitted to these compartments for the cooking of the vegetables. Great changes have been made in the construction of this piece of equipment, with the latest introduction of an automatic steamer which turns on the steam when the door is closed, shuts it off



as the door is opened, and brings the vegetables out of the steaming compartment on a movable carriage attached to the door of the steamer. This removes all danger of a scalded operator because of a door opened with the steam still on, and makes the handling of the heavy baskets far easier. Adjusting screws on the hinges of this door take up any possible compression of the gasket, insuring a tight fit at all times.

In this same department are located large stock kettles which range in capacity from 40 to 60 gallons. These may be built either of aluminum, cast iron or copper, retinned. The most expensive on the market today is one made of heavy copper and lined on the inside with a 1-inch thickness of pure block tin which must be put on piece by piece and then turned to smoothness. There also is being introduced at the present time a kettle made of pure nickel which will probably replace all other kettles when made commercially. Copper kettles that are retinned must be taken out and tinned again at intervals of every six months in order to insure safety against verdigris deposits. Aluminum kettles are very satisfactory, because they do not require retinning and they have, to a great extent, replaced copper kettles. Cast-iron kettles are perfectly satisfactory for pot roasting and other preparations which are not affected by the color of the iron, but their appearance is not attractive and consequently they are not popular. All kettles and steamers should be located upon a steel drip-pan made of heavy boiler plate sunk into the floor and provided with waste. Similarly, the kettles should be under a hood connected to the ventilating system to carry away all steam and fumes.

Adjacent to this department belong the pot-washing sinks, which should be made of heavy boiler plate and of ample sizes to carry the heavy utensils of the kitchen. Suitable racks and metal tables should adjoin them to provide proper working space.

Two of the most popular and profitable stations of the kitchen are the garde manger and salad counter, which should be located adjacent to each other and in front of ample service refrigerators. The salad counter should have ample table space back of it to enable multiple orders to be prepared in advance and placed in the refrigerators ready for service. The counters themselves should be refrigerated to insure cold plates for this service. The garde manger counter is supplied from a preparation room in which are located meat choppers, sinks, meat grinders, meat blocks, cutting benches and work tables.

The oyster bar adjoins the cold meat counter and should be built with a rustless metal or slate top provided with openings above an open space where barrels or cans collect the empty shells. An ice box back of the counter should be metal lined and have a series of wire mesh trays, about 4 inches apart, to carry the opened clams and oysters ready

to serve. The front of the counter is an insulated crushed ice box with insulated lift cover where the waiters secure in plates the crushed ice for each order.

The pantry counters and pastry counters also belong together, and from here are served all varieties of pastry, ice cream, hot drinks and cold drinks. Here, too, are prepared the breakfast services of toast and eggs, hot cakes and waffles. The equipment which is necessary in addition to serving counters are ample ice cream cabinets, soda fountain, coffee urns and breakfast grill. The coffee urns should be supported on a metal top stand with an enclosed cup warmer below. The construction of the ice cream cabinet should be suitable for mechanical refrigeration. The most satisfactory has a series of brine jackets connected together and of sizes suitable to carry the regulation packing can and brick ice cream containers. The walls should be of metal, and the covers also of heavy metal insulated and made in sections.

Back of or adjacent to the pastry counter is the bake shop. The principal fixture, naturally, is the bake oven, which may be heated either by coal, coke, gas or electricity, but always supplied with tile decks. In recent installations the electric bake oven seems to be preferred because of the perfect control of temperature and the ease of operation. The bake shop is divided into two departments, as a rule, one of which is used for making bread, rolls and biscuits, while the other prepares the pastries, cakes and cookies. The equipment which is essential in a hotel bake shop, in addition to the ovens, consists of work tables, marble-top bakers' table, landing table, dough trough, candy furnace, tilting pastry kettle, mixing machines, proof boxes, a refrigerator and sinks. In the larger places a dough mixer is also provided. In the smaller installations the mixing machine is also used by the vegetable preparation department for mashing and creaming the vegetables, whereas in larger installations a separate mixer for this purpose is purchased.

The dish-washing department (Fig. 7) is also a subject of considerable discussion and wide variation in its treatment. Many standard makes of dish-washers are on the market, all of which belong to the overhead spray variety, or, in other words, the dishes are packed in racks or placed upon conveyers which are carried through the machine, and first soapy water and then rinse water is thrown over them by means of centrifugal pumps or mill-wheel sprays. Nearly all of the larger machines have some means of either conveying the dish rack through on a chain conveyer or carrying the dishes through the machine on a conveyer belt. The best machines are provided with copper jackets mounted upon heavy tanks and carry pairs of centrifugal pumps to force the water through spray arms which revolve or are slotted to throw the water in all directions over the dishes.

Equally important with the selection of the dish-



washer are the size and arrangement of the tables. These tables should surround and adjoin the dishwasher and be made of heavy metal in the form of a shallow sink with sloping edges. These are pitched to drain, the clean dish tables back into the dishwasher and the soiled dish tables through openings into the garbage cans below. If the dish pantry is located where a basement or sub-basement is available, the swirl from the dishes is carried down a garbage chute upon a raking pit, where lost silver may be recovered and the garbage then put in cans in a cold room, which prevents all disagreeable odors. A separate machine for silver and glasses or, if not a machine, a separate set of sinks for this purpose, is essential. Placed adjacent to this department is a silver cleaning room provided with a burnishing machine for further cleaning and polishing.

The part of the kitchen exposed to the public rooms consists of the serving counter and dish and silver heaters in the center of the room. As nearly every proprietor is proud of the appearance of his kitchen, the general construction is to have all tops made of heavy gauge metal alloy that is non-corroding and can be highly polished, and with the fronts of all dish heaters made of white porcelain steel held in nickel silver or other nickel alloy facings. Concealed bolting allows these surfaces to be perfectly smooth, with all rivets and bolts unexposed. The interiors of these heaters are planished iron with ample coils beneath the shelves to insure hot dishes at all times. The cold counters for garde manger and salad service are built to match these dish heaters, with the exception that the doors are insulated and drop down instead of being sliding or raised, and also that space for coils at the back is provided.

Where the initial expenditure for this type of construction is too great, the nickel alloy tops are replaced with polished steel and white porcelain with

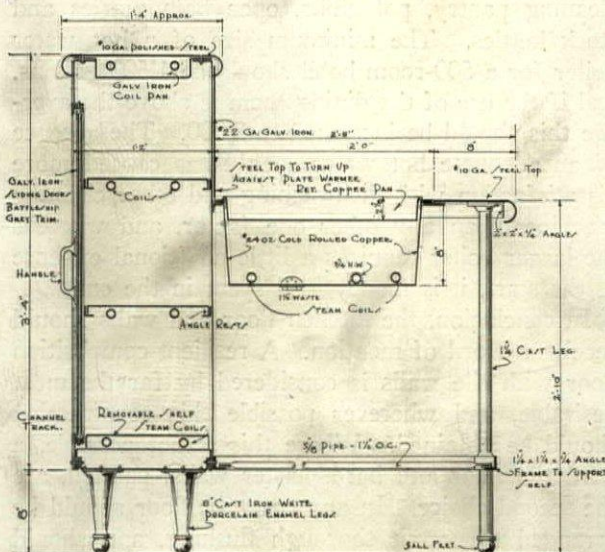
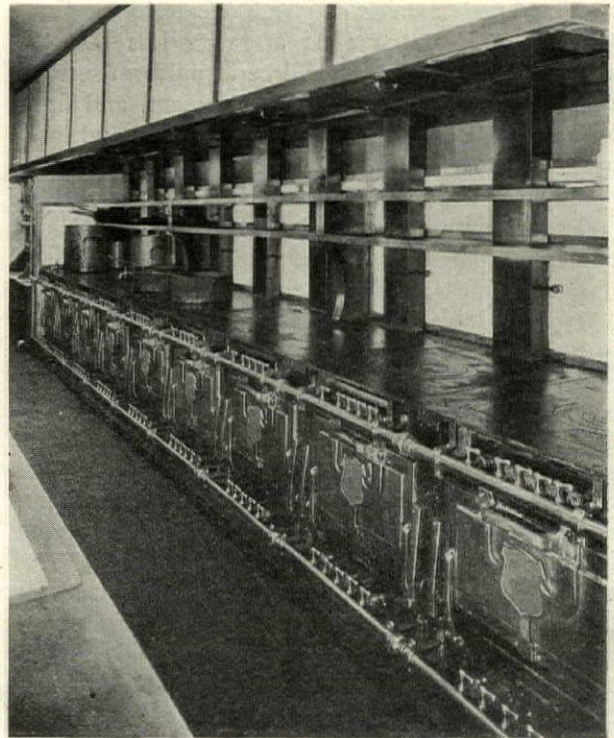


Fig. 9. Cross Section of a Steam Table and Plate Warmer, showing standard construction desirable



Range Section of Kitchen in Sheridan Plaza Hotel, Chicago. Note white glass hoods over ranges. Gas fuel

planished iron, and polished steel trim is used in place of the nickel trim. A still further reduction in cost may be made by the use of galvanized iron, painted and finished with angle and band iron trim finished in battleship gray. The counters back of the heaters are made of nickel alloy or polished steel in front of the ranges, and of sectional maple on the opposite side for salad, pantry, pastry and garde manger stations.

All of the tables throughout the kitchen should be made of sectional maple in strips not over  $1\frac{1}{4}$  inches wide, tongued, grooved and rodded together

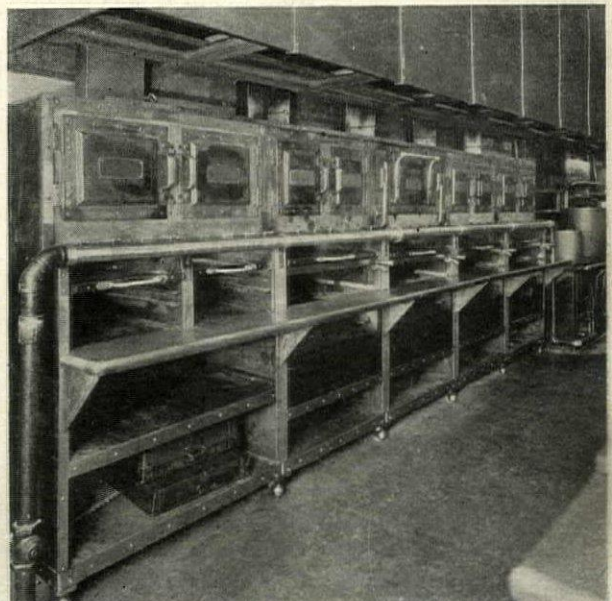


Fig. 8. Broilers in the Drake Hotel, Chicago

2-8  
1-2  
4-0



and mounted upon iron standards. None of the sinks should be made of a gauge less than 14 and as far as possible should be in uniform sections 24 inches square for each compartment, and fitted with separate hot and cold water faucets and large waste openings. In the better installations all exposed sinks are made of non-corroding nickel alloy and fitted with splash backs 12 inches high which conceal all plumbing connections.

The banquet service kitchen should consist primarily of table space with suitable refrigeration and steam table to insure proper service. The steam table should be provided with a series of uniform pans approximately 12 inches square and 12 inches deep set in the center of a wide table facilitating service on both sides. This room should be provided with a battery of urns, a large refrigerator and conveniences for washing the dishes there or for conveying them to the main dish pantry. All available wall and floor space should be utilized for shelving and tables, and the tables themselves supplied with elevated shelves above and wide shelves beneath. Some of the larger hotels add to this equipment broilers and ranges, but as a general rule this is not deemed essential, and the entire food preparation is completed in the main kitchen.

One of the most difficult problems to solve is the sanitary and satisfactory disposal of garbage, and many means have been sought for a satisfactory solution. As described in connection with the dish pantry, a garbage chute leading to a raking pit adjacent to a garbage freezer serves the double purpose of salvaging lost silver and removing immediately from the kitchen all of the odors connected with food refuse from the dish tables. However, this is only possible where a basement or sub-basement is located beneath the dish pantry and relatively close to freight elevators.

Where this is not possible, it becomes necessary to find some other means for garbage disposal, and in addition to the garbage from the dish tables there is refuse from the pantries, poultry rooms, garde manger counter and bake shop, which amounts to a considerable quantity in the course of a day. Incineration is one of the most rapid and complete means of handling this garbage and is generally accomplished by an incinerator located apart from all other equipment with just enough gas burners to supply the flame for igniting the garbage. Owing to the amount of grease which is always present, the heat from burning garbage is terrific, and it is necessary to have a separate flue leading to the highest point of the building and thoroughly insulated from any other part of the structure. Where these precautions have not been taken, disastrous fires have resulted, and if the pipe from the incinerator to the flue is not made very short and of very heavy material the flue will very quickly burn out, and no amount of covering will protect it or surrounding articles from the heat. In the larger hotels this incinerator is built in the form of a brick oven en-

tirely encased with 6 inches or more of fire brick, and this acts as an added protection against the heat.

Much argument has arisen over the relative horsepower required for the operation of various pieces of equipment in kitchens, and, owing to the fact that they are not all used at the same time and that the radiation is extremely different in different locations, it is impossible to do otherwise than approximate the capacity that is required. In figuring the horsepower of boilers these figures may be assumed to be as near the code as possible, or, in other words, a 30-gallon jacket kettle, a 30-gallon coffee urn, 70 lineal feet of enclosed or open  $\frac{3}{4}$ -inch pipe and one open jet such as used in sectional steamers are each approximately equivalent to 1 horsepower. If these figures are applied to the various steam tables, coffee urns, steamers, dish heaters, etc., that are required in a 500-room hotel, it will be found that an average of from 20 to 25 horsepower will be required in case all of them are to function at one time. However, as this is seldom the case, two-thirds of the capacity, or from 15 to 20 horsepower, would in most cases be sufficient. The maximum figures given would be ample to apply with a full margin of safety. The minimum average of steam which should be considered at each fixture should be 25 pounds, and the reducing valve should be set at about 35 pounds.

One of the features the importance of which is often under-estimated by contractors and owners in the equipping of a hotel is the amount of hot water which would be required. Where all the equipment is heated by high-pressure steam it is possible to reduce the capacity of the hot water boiler, due to the fact that steam operates with great rapidity and it is even possible to admit to steam tables, coffee urns, etc., cold water and still have it heated with sufficient rapidity not to retard the operation of the kitchen as a whole. Places where hot water is especially needed and used in large quantities are the dish-washing pantry, silver-cleaning pantry, pot sinks, open bain maries and stock kettles. The minimum size of a hot water boiler for a 500-room hotel should be 1,500 gallons, and if the use of the dining room is above the average this should be increased to 2,000. The absence of an adequate hot water supply has caused more dissatisfaction with dishwashing and other cleaning machines than any other one factor, and whereas the larger boiler requires a little additional expense at the start, it is money well spent in the end.

In conclusion, the kitchen floor and walls should receive a word of mention. A resilient composition floor with tile walls is considered by far the most desirable, and wherever possible this construction should be obtained. Where this is not possible, a hard tile floor and hard plaster walls, painted, are the second choice. In any case, the floor should be arranged to permit thorough flushing, and should be provided with drains at intervals to secure easy and quick drainage.



# The Hotel Laundry

By JOHN J. PHILLIPS

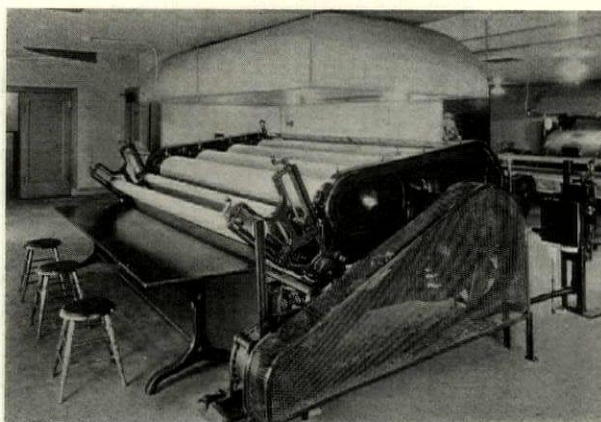
of Crane-Leslie, Inc., Equipment Specialists and Engineers, New York

As a purveyor of service, prompt, adequate and efficient, it is wise that the hotel be self-sufficient and not dependent on outside agencies in any phase of its functions. "Foreign entanglements" do not make for "domestic normalcy," whereas proprietary control and supervision of the various operations insure consistently satisfactory results.

Properly laundered linen is an essential of good service, and it is desirable that this be supplied by the hotel itself. The laundry is now beginning to receive the attention the subject merits, and it is due to the furtherance of education that operation of the laundry by the hotel itself is being recognized as a necessity. Of late there has been some discussion in hotel and other publications bearing on the conditions that should obtain to permit the hotel to profitably install its own plant.

The laundry, properly planned, adequately equipped and efficiently managed, will give satisfactory service, but whether or not the initial investment is warranted from a strictly financial viewpoint depends upon the size of the hotel, or, which is synonymous, the quantity of linen to be laundered. Current performances prove that it need not be larger than 100 rooms, and that for the hotel of 300 rooms or more to assign such work to outside laundries is to suffer a cost very much in excess of that established by private operation. Seven months ago a 500-room hotel in the northwest, with a newly installed plant, wished to determine the exact money saving effected by the laundry in a given period of time. Detailed cost records were maintained to include cost of productive labor, supplies, superintendent's salary and overhead, and such indirect charges as heat, light, power, etc. At the end of seven months the saving was shown to be \$7,430, or approximately \$13,000 per annum. Particularly satisfactory results have been obtained by a middle-west hotel of 180 rooms and one of 80 rooms in Kansas, both of which report a reduction in costs of 50 per cent. These two instances are cited to indicate the degree of success that can be achieved in this regard by the small hotel, and there are other average cases of record which show conclusively that small installations may be made with profit.

While it is imperative that the investment in plant

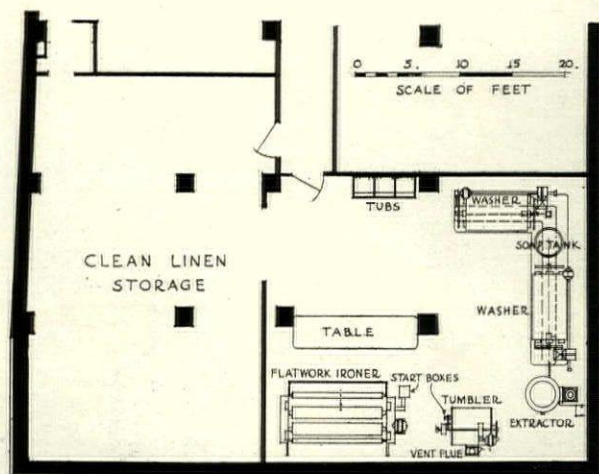


Flat Work Ironer, Wade Park Manor Hotel, Cleveland  
Note large exhaust hood

and machinery yield an adequate return in the form of lower laundry costs, it must be realized that there are other obtainable benefits to be secured by hotel operation. Many managers have learned from experience that only by having complete control over the work will the hotel be enabled to maintain a satisfactory standard of laundering, and be assured a constant supply of snow-white,

clean-smelling linen for the guest. Into the establishing of operating costs the preservation of the linen stock enters as a controlling factor. It does not seem logical to take for granted the fact that the outside laundry can give the same personally supervised laundering, so necessary to the long life of the linen, as is assured when the work is performed under the watchful eye of the hotel superintendent, who is directly responsible to the hotel manager for material fluctuations in stock. Especially where the hotel uses large quantities of linen, it is vital that the utmost care be expended to prevent waste and destruction.

A great amount of flexibility is required in the management of the modern hotel, and this is particularly true in the case of hotels situated in centers where conventions and gatherings take place. At these times there exists a heavy demand for linen



Laundry Plan, Carlton Terrace Hotel, New York  
Charles B. Meyers, Architect

Small plant for flat work only in residential hotel of 245 rooms, divided into 150 apartments and large restaurant



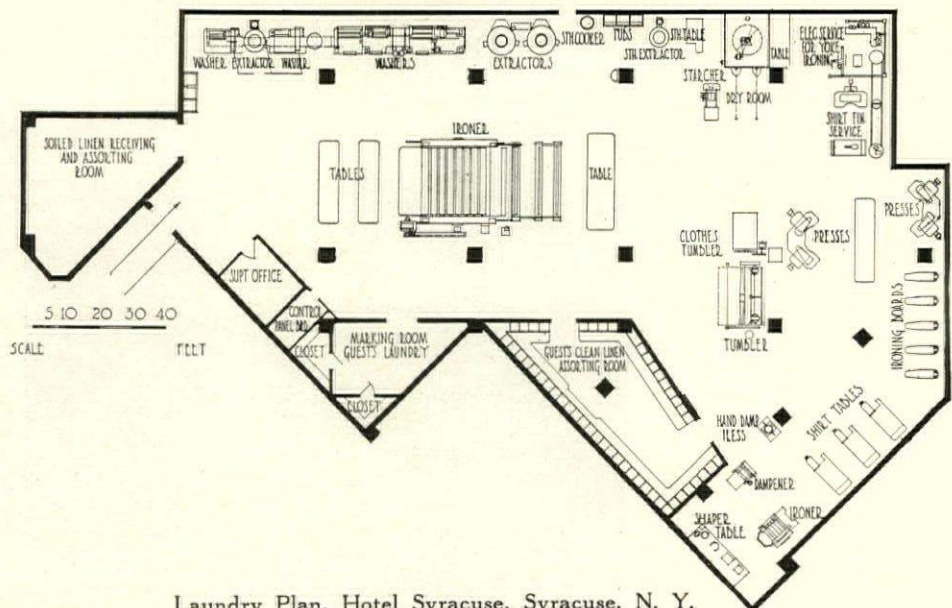
supplies, and it is consequently necessary for the hotel to carry in stock a large enough quantity of linen, or to have means of enabling it to reclaim the linen for use again as needed. Of the two it is less expensive to reclaim the soiled linen and pass it back into circulation in the shortest possible time. With this as an added consideration, laundry equipment has been installed to distinct advantage and is daily proving its efficiency in quickly relaundering linen that would otherwise be withdrawn from use for one or two days at a time. It has been demonstrated also that danger of loss of pieces exists in proportion to the frequency with which linen is removed from the hotel premises. The location of the laundry in the hotel proper does away with these constant petty shrinkages that constantly attend the shifting of large quantities of linen to outside agencies.

In addition to taking care of the regular house linen supply many hotels have provided separate departments for the handling of the laundry work of guests, and the installations have made it possible to give one-day service—a convenience found to be appreciated by patrons, and aiding the hotel to fulfill its function of giving ideal service. Practically every hotel having over 500 rooms can develop a guest work department that will be at least self-supporting. By adopting the necessary measures to inform the guest that there is to be had for the asking a prompt and high class service of this nature, the department

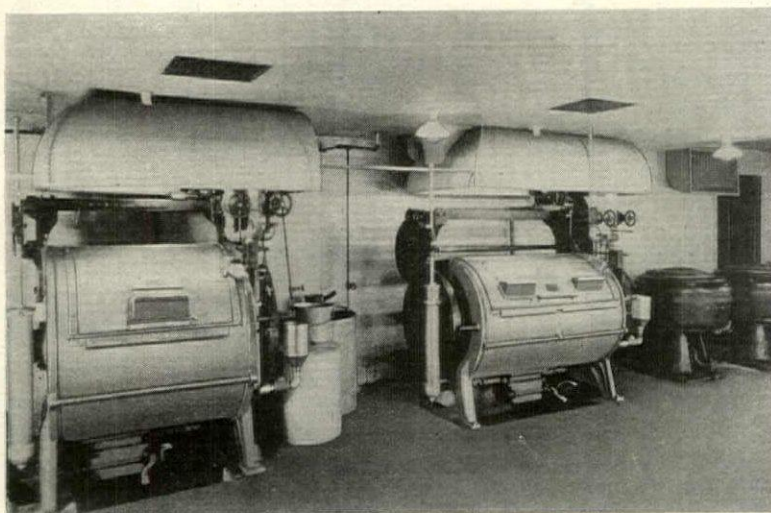
can be made to not only pay for the laundering of flat work or house linen, but to produce a reasonable profit as well. To secure a bona fide record of performance in this connection, one of the large Statler hotels was visited. It was found that a very satisfactory income is derived from the guest work department,—enough to pay for all productive labor and the superintendent's salary. The prices charged are reasonable, being only slightly in excess of the commercial rates obtaining in that city. Some very satisfying results have been achieved by hotels having a seasonal business—summer or winter resorts—in places where good laundry service is not in the majority of instances available.

In proportion to the increasingly recognized importance of the laundry the understanding is now being brought to the fore that as much care and expert attention should be employed in locating, planning and equipping the laundry as is usually devoted to other not more important departments in the hotel. In the past it has been the general policy to relegate the laundry to whatever space remained after all other departments had been satisfactorily located, and as a consequence many laundries are found to be situated in the most unusual places imaginable, totally inadequate for their needs. The hotel building should be planned to admit of proper and efficient installation and operation of the laundry machinery, and it is requisite that the architect co-operate in seeing that the necessary floor space and ventilation and other equally important details are provided.

Hotel laundries are now generally installed in the basements, and it is

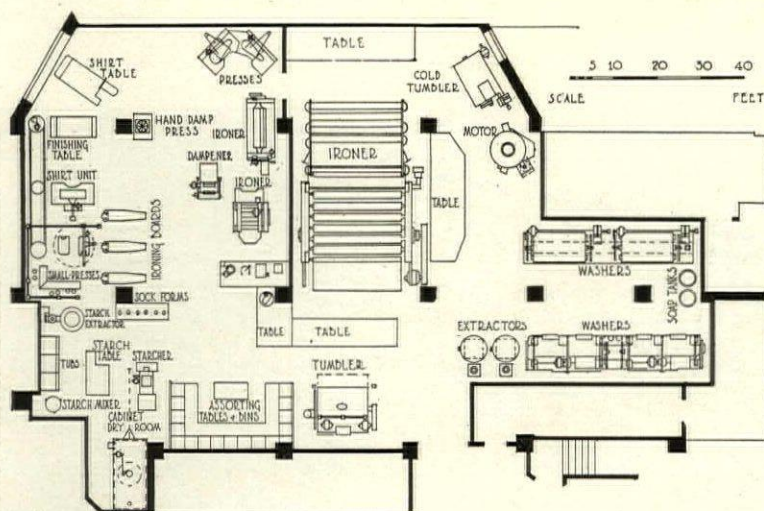


Laundry Plan, Hotel Syracuse, Syracuse, N. Y.  
Complete plant with necessary sorting, marking and storage for 600 rooms  
Geo. B. Post & Sons, Architects



Washers and Extractors in Wade Park Manor Laundry, Cleveland. Note exhaust hoods





Laundry Plan, Hotel Hamilton, New York

Plant to handle guest and flat work in residential hotel and adjoining apartment house. Capacity, 1400 rooms divided into 400 apartments

Schwartz & Gross, Architects

imperative that an adequate and practical system of ventilation be employed. The laundry at its best is a steamy, odorous, hot department, and large exhaust vents should be so located that the air may be changed every few moments. Where possible metal hoods should be placed over washers, tumblers, and flat work ironers, as these machines discharge a great deal of steam which can thus be carried off direct without traveling through the entire room before reaching exhaust outlets. In addition to providing a well-ventilated room careful attention must be paid to the illumination of the department. Individual electric light should be furnished for each machine, and the general lighting system be none but the best. Matters are very much improved in this direction by having painted walls and ceilings of white. Where possible seats for female employees should be supplied. To secure a high grade of performance from employees it is necessary not only to provide the proper machinery and tools, but that the conditions and surroundings in which they work be made as cheerful and comfortable as possible. Any measures adopted towards this end will be sure to yield on the owner's investment a 100 per cent return in the form of an increased quantity and higher quality of output.

The removal of soiled linen to the laundry is best accomplished by means of chutes having openings on each floor. These chutes, into which the pieces are dropped, deposit them as near to the washer machines as practical. A separation is then made for each class of linen—sheets, towels, napkins, etc. If chutes are not available, the linen can be conveyed to the laundry in basket trucks and by ele-

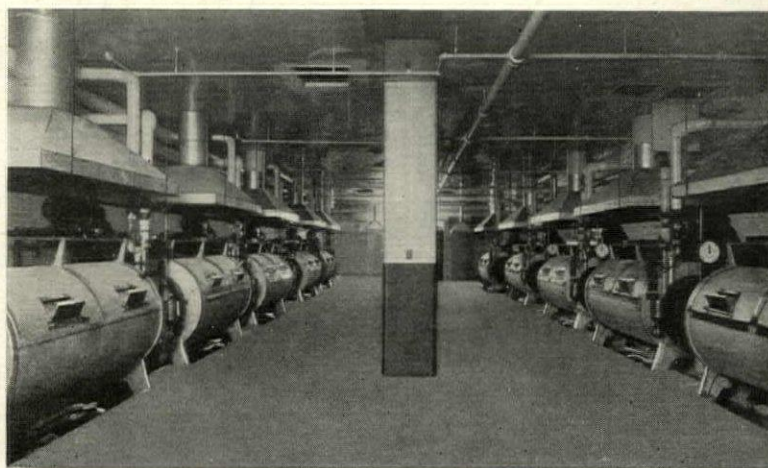
vators, but chutes mean less handling.

In planning the layout of the laundry, machines should be placed so that they will preserve the correct sequence of operations and permit the linen to pass through the various processes without waste motion. In this same connection it is advisable, in order to prevent any hindrance or confusion, to utilize more than one method of ingress and exit and to arrange to have the linen enter the laundry room at one end and pass out through the other. After the linen is sorted and classified it is placed in the washer machines and then passed to the extractors where surplus water is removed. Heavy bath towels next go to the tumbler and thence out. All other articles of flat work proceed to either the shakeout tumbler or the flat work ironer direct. The ironing finished,

the linen leaves the laundry proper and is received into the storage room close by, and is now available for requisition. In order to maintain a proper division in these two different classes of laundering it is recommended that the guest work department be separated from the regular flat work or house linen division.

Plans of laundry departments given here show several recent representative installations. In addition to the space occupied by the laundry proper it has been found advisable to have a small room for the receiving and sorting of soiled linen, also another separate room, provided with the necessary bins, shelves, etc., which is employed for storage of the linen after it has been laundered.

At least 100 pounds steam pressure at the boiler is required for the laundry. Flat work ironers, presses, tumblers and collar equipment of the guest work department produce best results on 80 to 100 pounds pressure. The return steam from these machines can be used in the heating system,

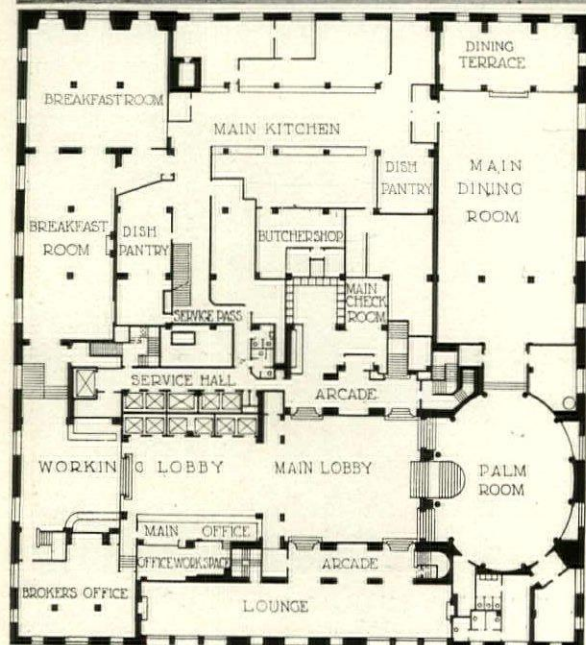


Washers in Hotel Pennsylvania, New York  
Shows close spacing possible in restricted area



# The Roosevelt Hotel, New York

GEO. B. POST & SONS, Architects



THE Roosevelt Hotel is now being built in New York, and both in its design and construction it is unique among large metropolitan hotels. It is located in the Grand Central zone, and a large portion of it is built over the incoming tracks of the Grand Central Terminal. The handling of foundations and erection of the steel framework without disturbance to the railroad traffic, and the excavation and construction of the extra sub-basements at the front of the building to offset the space occupied by the tracks, constituted engineering problems of considerable magnitude. There will be direct connection by underground passage with the station.

The building is interesting from a plan standpoint in the large proportion of store space that has been incorporated on the ground floor without any sacrifice in the disposition of the public rooms. The relation of the various public rooms, including the ball room, to the lobby floor, is in accord with mod-



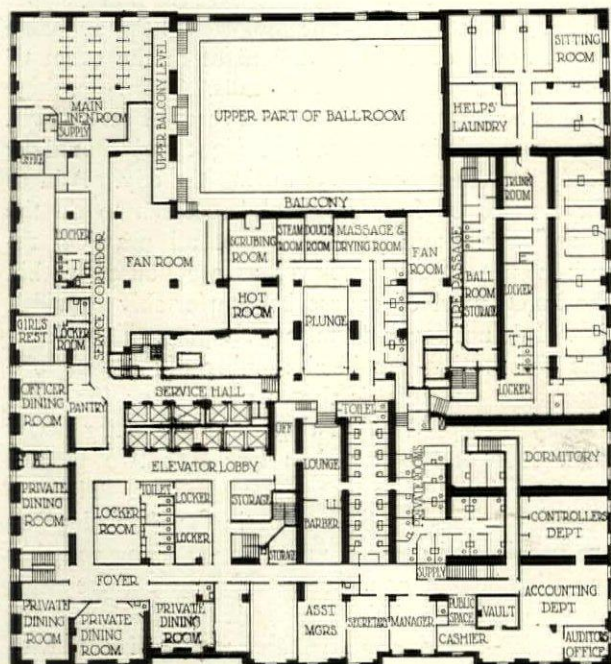
ern metropolitan requirements and, arranged on various levels, the ensemble will present an interior of great distinction and charm.

Among the new features incorporated in the Roosevelt is an emergency battery of small rooms for the convenience of applicants for rooms who cannot at the moment be accommodated with permanent rooms. These rooms, numbering 47, will be connected with the Turkish bath equipment on the fourth floor of the hotel. There is also a large dormitory for overnight patrons of the baths.

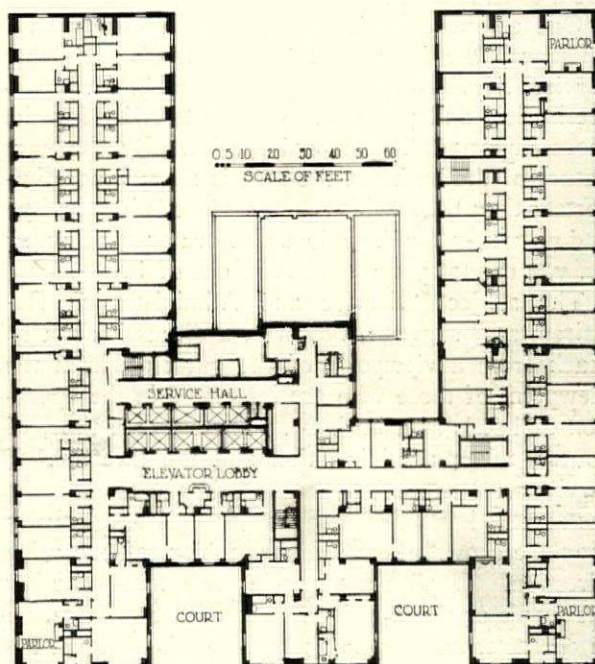
A second feature is the children's room, to be called the "Teddy Bear Cave." This is placed on the 15th floor and opens on the roof formed by

the setback at this level. It will afford both interior and exterior accommodation for children of the guests and visitors. Another feature, introduced through the desire to attain complete service, is a kennel for pet dogs of the guests. It is on the 19th floor and will have an open-air run on the roof.

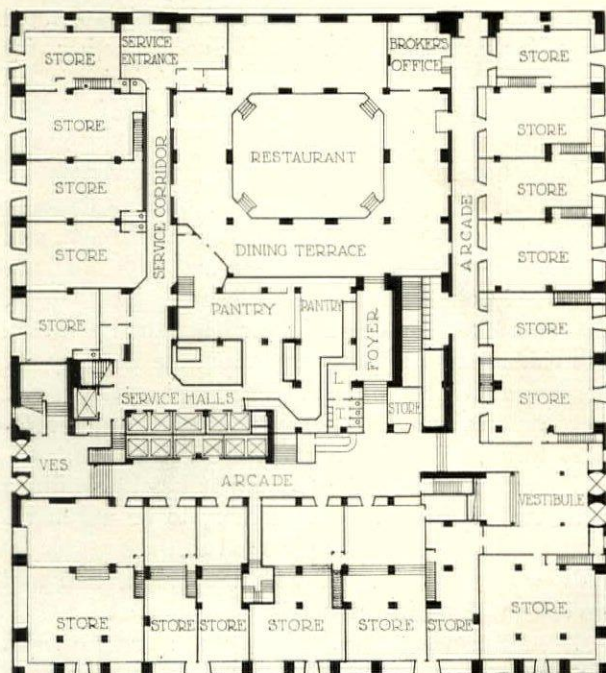
Still another desirable and perhaps original feature in American hotels is a large number of guest rooms which have the advantage of private roof gardens. These rooms, numbering about 150, are on the two setback floors, and they will be assigned to permanent guests. The roof plots will be separated by lattice work, and each room will have access to its roof space through a French window.



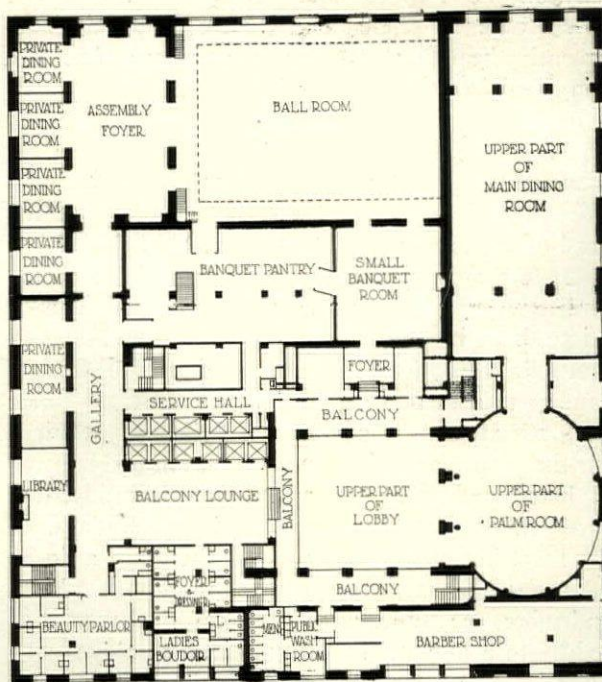
SECOND FLOOR PLAN



TYPICAL FLOOR PLAN



GROUND FLOOR PLAN



MEZZANINE FLOOR PLAN



# Service and Administration Requirements

By HORACE LELAND WIGGINS

*Vice-president and Managing Director, United Hotels Company of America*

SERVICE and Administration Requirements of Hotels" is a subject more suitable for a book than for a short article. For one thing, it is as varied in its scope as are the character and size and number of hotels. There are certain fundamental principles, of course, which apply to all hotels, or rather, to give it an even broader application, to any place where a guest is entertained for a consideration.

One of these fundamental principles—perhaps I might say *the* fundamental principle—is satisfying service. Service depends upon two main factors,—mechanical and personal. Of the two, by far the more important is personal service. By the very nature of the business, the man is always more important than the machine. Its essence is hospitality; and no matter how ingenious an elevator system may be, you cannot get a handshake out of it.

The subject "Service and Administration Requirements" suggests, however, a discussion not so much from a viewpoint of the guest as from the viewpoint of those who are interested in the operation of hotels as a business. There was a time, of course, when administration and the direction of service were not so important as they are today. In the ancient inn, where one man and his wife usually "ran the show," there was no problem of executive direction. It all rested under one hat,—whether the man's or the woman's. But with the alteration in character and development of hotels, through the various stages up to this time, when we have not only one hotel to consider but a large number of hotels, all inter-related and directed from a single executive headquarters, then the questions of service and administration become important.

In our United Hotels Company organization we are finding it more and more essential, in all branches of the hotel work, to departmentalize with efficient and experienced men and women at the head of each department. My personal field is hotel operation, and my work keeps me so busy that I find it rather difficult to find time even to tell anything about it. Even now I am faced with such a multiplicity of details on the subject that I must confess to a certain sense of bewilderment. There is, for example, the question of "planning required for the proper organization, supervision and housing of hotel employees." To an outsider, possibly, that factor might appear important, but nowadays, as the hotel business has developed, there are a dozen other factors that are even more important. More and more, the tendency of practical hotel men is to reduce to a minimum the number of employees who must, of necessity, be housed in the hotel proper. With hotels costing \$4,000 a room to erect, it will

be obvious even to those who are not bothered with the problem of balancing the ledger that no large portion of the hotel space can be given for the housing of employees. As a matter of fact, in these days, in a large metropolitan hotel the only provision made for accommodations for employees is in respect to the housekeeper and a small part of her crew,—a half-dozen or a dozen will suffice for all purposes. It is necessary to have the housekeeper or her assistant, with some competent help, available at all hours of the day and night in the event of sudden changes or emergency calls. Then, too, there should be accommodations for a force of scrub girls, who begin their work late at night and should be ready for emergency calls during the day. Add to these three or four practical housemen to do the rough work, and you have met all practical requirements. Such employees as are housed within the hotel, must of course be comfortably provided for. I do not favor dormitory sleeping. Experience has shown that the ideal number of women to a room, for example, is three; not two or four, but exactly three. We find that three get along better than four and better than two. If two have a rumpus, the third is there to suppress it. There is quite an interesting little story in the psychology of the number of persons who can get along together most happily in one room. Of course there must be the proper provisions for toilet and bath and for recreation,—one large general sitting room with reading material, phonograph, comfortable chairs, etc. Naturally, the rooms must be airy and inviting; in fact anything less than that could not be tolerated in a large, modern hotel structure, whether for guests or for help. The dormitory idea also is too easily suggestive of jollification parties, which should be discouraged.

Of course in planning for servants' quarters the least desirable section of the hotel space is logically selected—some section which is near the freight and service elevators so that the servants will not have to pass through the guests' hallways. Each of the servants should have a locker furnished with an individual padlock, purchased from the hotel by the servant at wholesale price. The timekeeper has one key, the employe the other, which makes it unnecessary to pry open the lock when a key is lost.

Policies regarding the feeding of hotel help differ with various hotels. It is coming to be a general practice, however, to supply food to those employes only who are connected with the preparation and serving of food in the hotels.

Dining provisions for this help are best provided by a cafeteria arrangement located conveniently to the service department. Separate rooms should be



provided adjacent to the cafeteria counter to accommodate each class of employees. That is, one for women, one for men, and one for the officers, and where colored waiters are employed, a separate room should be provided for them. In determining the sizes of these rooms it is safe to figure that only one-third of all the employees to be fed are to be seated at one time.

The help should be given access to the hotel through a rear entrance, which should preferably be separated from the entrance through which supplies to the hotel kitchen are delivered. At this entrance should be a timekeeper, preferably enclosed so that he is protected against drafts in cold weather, who will check every person's entrance and departure, and to see that nothing is carried out of the hotel. Toilet rooms for the help should be located throughout the building in convenient relation to the working parts. Showers also should be provided adjacent to the locker rooms. In hotels where a large number of female resident help are employed, it is the custom to provide a special help's laundry in which the women can do their laundry work. The number of employees approximately required to operate hotels, may be estimated in the proportion of 80 employees to every hundred rooms.

The various departments of hotel operation are more or less familiar to everybody,—office force, housekeeper, laundry, and the superintendent of building, under whose direction come the painters, carpenters and upholsterers; the engineer with his electricians, plumbers, steamfitters and firemen; maitre d'hotel with his dining room crew; the chef, with all employees who are concerned with the preparation of food; the steward and his crew, who look after the matter of raw food; the porter and his assistants; the head bellman and his crew, and in the very large hotels, the floor clerks. Then we have the hotel valet and the various departments which might be put under the head of "concessions," such as cigar stands, coat rooms, checking rooms, stenographers, taxi service, theater ticket agencies, newsstand, flower shop, etc.

In these modern times, as I have said, very few of these employees must be accommodated with sleeping quarters inside the hotel. All that is necessary is only to "man the ship" day and night and to be ready for emergencies. As the modern hotel runs for a greater part of the 24 hours, it is obvious that there is no necessity for making provisions such as they have at firehouses and police stations; nobody has to "slide down the pole" to respond to the alarm, so to speak.

I have frequently been asked if there is any proportionate decrease in the number of employees required with the development of mechanical apparatus in hotel operation. I say no. In the old days one man could grind out enough ice cream to serve all the guests in the place. Now we make ice cream by machinery, but the machinery has to be taken care of, the ice cream has to be served and

the additional dishes have to be washed, and the cashiers have to make change and the bookkeepers have to keep track of the cashiers' accounts, and bills have to be paid and, finally, about the only saving factor in the whole situation is that the modern hotel man does not have so much difficulty getting his profits to the bank, because, proportionately, the profits are about the only things which have not kept pace with the increased business.

If the modern hotel operator did not keep constantly in mind the problem of keeping the payroll down, there would be still less profit, of course. In the old days the cashier in the front office usually could take care of the checks from the restaurant. Nowadays, with two or more restaurants of various kinds running, separate crews are required. A saving may be effected by intelligent planning of the various departments. I recently heard of a case which illustrates my point. A certain hotel has both a grill room and a coffee room, separated by only a wall. The original plans would make necessary the employment of two cashiers. By cutting a hole in the wall, the checks from both departments could be taken care of by one cashier. Assuming that there are two crews of cashiers, each cashier being paid \$50 a month, by this simple expedient of cutting a hole in the wall, they save \$100 a month, or \$1,200 a year, the interest on an investment of \$12,000.

In planning the service portions of the hotel architects should keep constantly in mind that too much study cannot be given to the economical arrangement of the various working parts. Every cubic foot of construction has to be paid for, and if wasteful use of space occurs it places a serious drain on overhead costs. A thorough study of the work involved in serving food in restaurants and its preparation in the kitchen will help architects to visualize the problem, and I would further recommend that they make a study of steamboat and dining car construction as examples of efficient service in restricted working spaces. The kitchen and service rooms should be arranged to have the utmost convenience and should also be as compact as possible. Convenience does not mean using excessive space, and in the smaller hotels particularly the layout should be arranged with the idea of one man's covering more than one station. The kitchen, whenever possible, should be located on the same floor and adjacent to the dining room with the largest seating capacity.

The laundry in a hotel is important, and an entire article would be required to cover the subject in a thorough way. I will, therefore, confine myself to generalities. Unless a hotel has 500 rooms or more, it will rarely pay to do what is known as bundle work—that is, shirts, collars and personal linen, sent in by the guests of the hotel. With less than 500 rooms, this class of work can be more profitably be sent out, and the flat work—sheets, towels, napkins, tablecloths, etc.—only be done in the hotel laundry. On account of weight of machinery, and



noise and vibration when it is in operation, as well as the danger of water overflow, it is best to locate the laundry in the basement, taking care to have the space used for this purpose well ventilated by intake and exhaust air fans. A hotel should without question do its own flat work. It is inconvenient to send this class of work out. Not only do linens last longer when done in a well conducted hotel laundry, but the danger of loss of articles, which often occurs in sending them out of the hotel for laundering, is thus avoided.

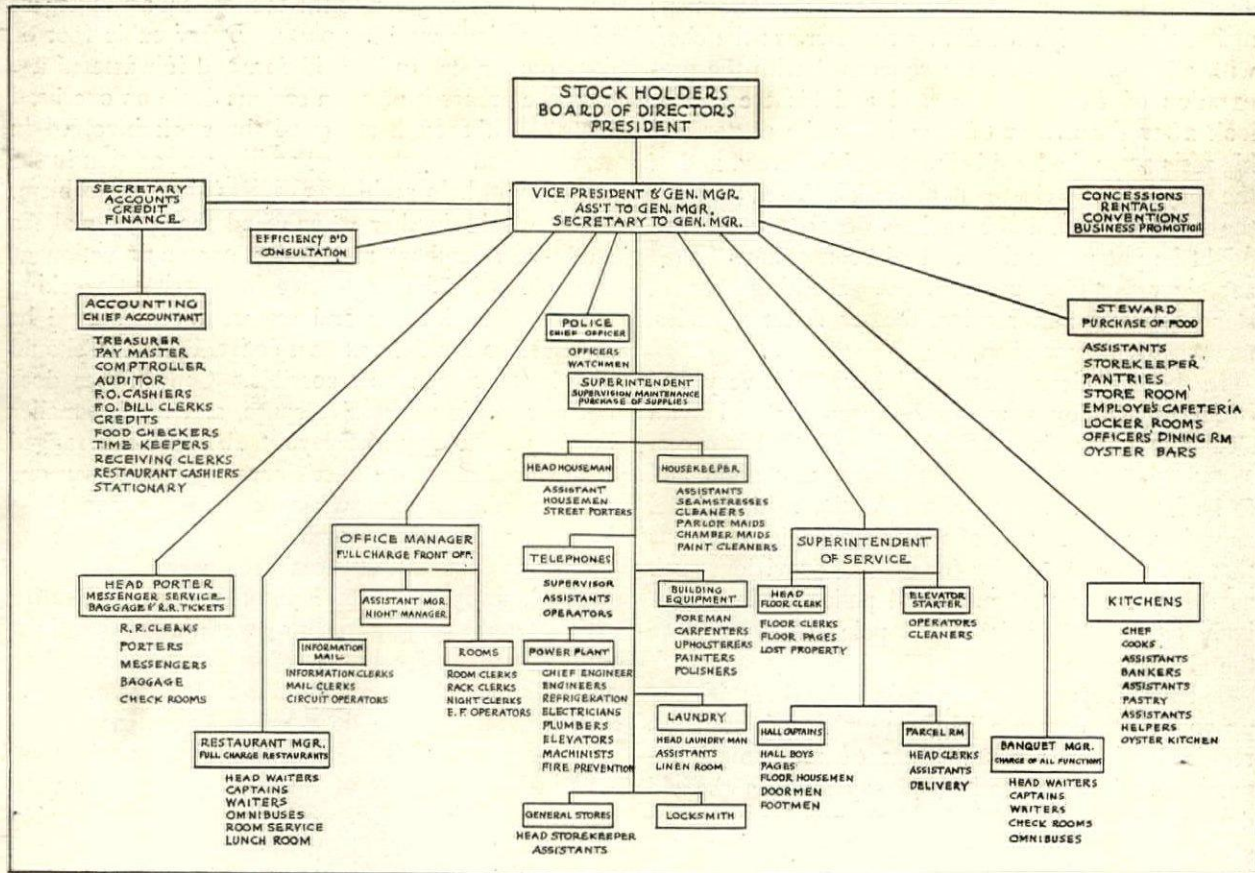
Some mention might be made of instances where extravagance in the use of working space may creep in. Room service is an element where excess facilities are frequently provided. In hotels of 400 guest rooms and under, this service should be supplied directly from the main kitchen by means of easily accessible elevators. In hotels of 1,000 or more guest rooms, serving pantries on alternate guest room floors will be required. The fact that each of these pantries must be manned by two men, one to take orders and the other to distribute them, indicates the losses that would accrue from extravagance in this phase of hotel service.

Among other details of plan that contribute to good service with fewer employes the linen supply rooms may be mentioned. The main supply of linen should be located as near the center of the building as possible and in close proximity to the service elevator. In a ten-floor hotel it will be most convenient to have it on the fifth floor; it should be

located so that it can have natural light for the seamstresses who work there; also a room should be provided near by to take care of surplus linen, the normal supply being kept on open shelves. In addition to this central room there should be a linen closet on each floor, also centrally located. The maids receive each day the supply of linen that they will require for the floor, and it is kept here until needed. On every guest room floor there should be ample closet space to take care of the storage of cots, cleaning utensils and other items.

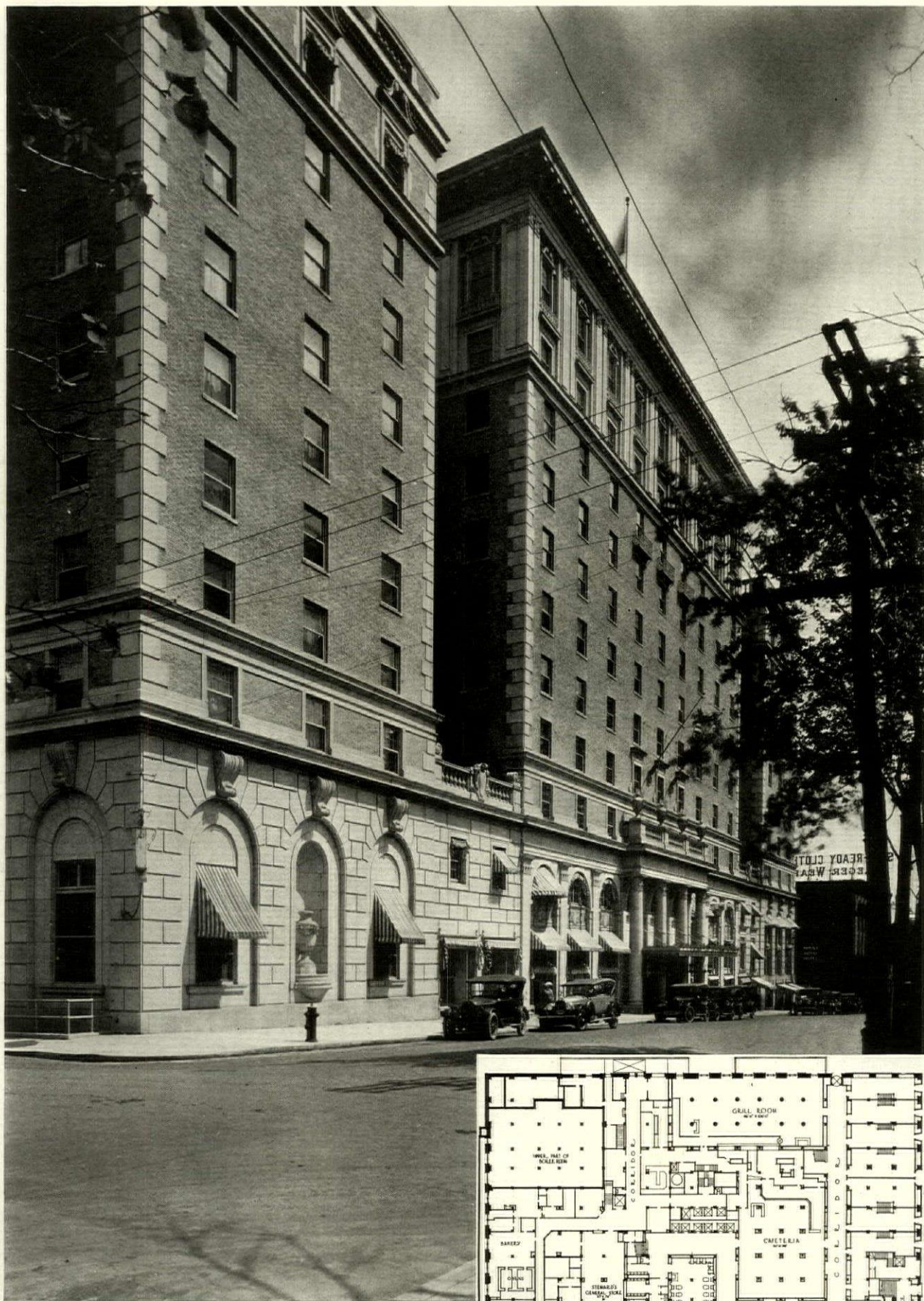
In general, the problem of planning for easy administration should be approached in much the same manner that a manufacturer determines the layout of machinery in a factory. Effort should constantly be made to reduce the amount of travel between necessary points to the minimum.

As said already, a basic test of the efficiency of a hotel plan from the standpoint of profitable operation is the amount of cubic footage it contains in comparison with the number of guests the building will accommodate. As a guide for determining the effectiveness of a plan from this standpoint, I would say that a carefully planned hotel of 200 guest rooms should not exceed in contents 1,000,000 cubic feet, exclusive of space devoted to stores and such other features for which a definite rent, returning a profit, is charged. It might be said that very few hotels meet this test, but it will serve to prove the necessity of limiting the amount of building volume to the minimum consistent with good planning.



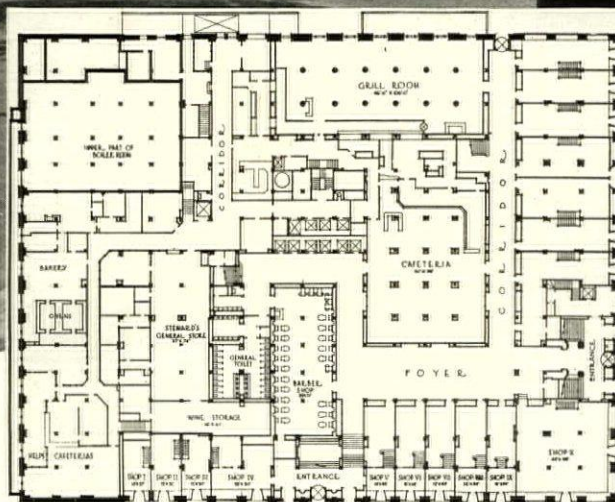
Organization Chart of Large Metropolitan Hotel  
Published by courtesy of "Hotel Management"





*Photos, Paul J. Weber*

MOUNT ROYAL HOTEL, MONTREAL  
ROSS & MACDONALD, ARCHITECTS



GROUND FLOOR PLAN



# MOUNT ROYAL HOTEL, MONTREAL

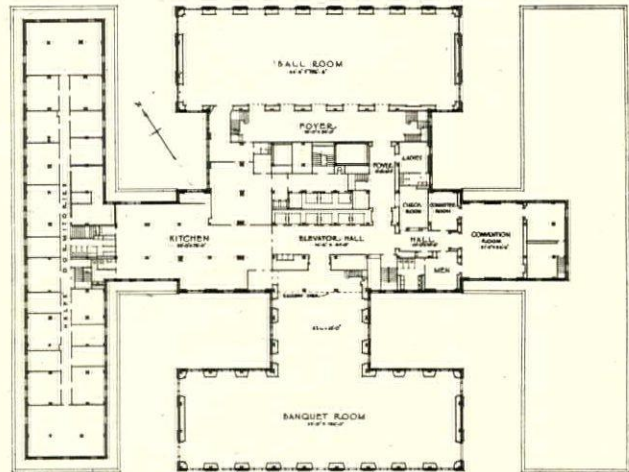
Illustrations on Plates 85-88

This is the largest hotel in the British Empire, and has been designed to meet the demands of tourists, traveling men and conventions. The building contains 1,046 guest rooms, each provided with private bath. The dining facilities are especially ample.

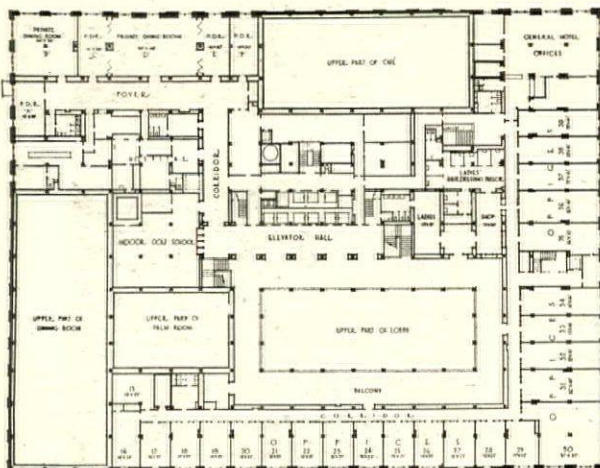
The building contains 9,000,000 cubic feet, and the cost, including land and necessary financing arrangements, approximated \$10,000,000. Construction was begun September 9, 1921, and completed December 20, 1922. The exterior materials are granite and buff cement with light buff brick for the main walls.

Heating is by an exhaust or low-pressure steam vacuum system controlled by thermostats. The mechanical equipment includes a laundry for both flat work and guests' service; a two-unit refrigeration plant, each unit of 35 tons capacity; ventilation for all public and principal service departments, comprising 11 supply fans and 14 exhaust fans; and a complete pneumatic tube installation. Provision is made so

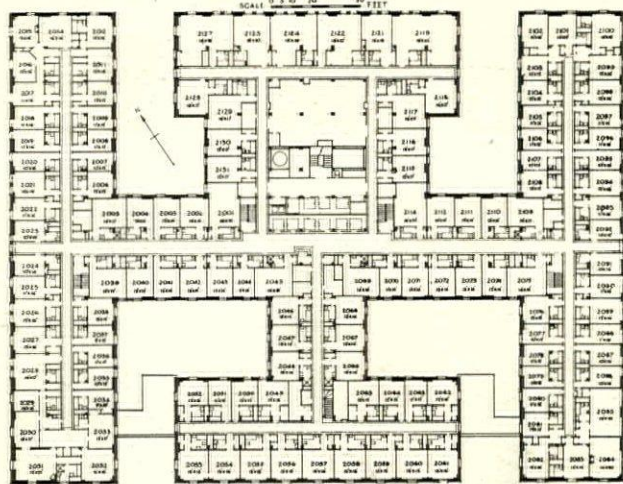
that electrical current may be purchased or generated in the building. The boiler plant consists of two 400-h.p. and two 300-h.p. water tube boilers, designed for 165 pounds pressure.



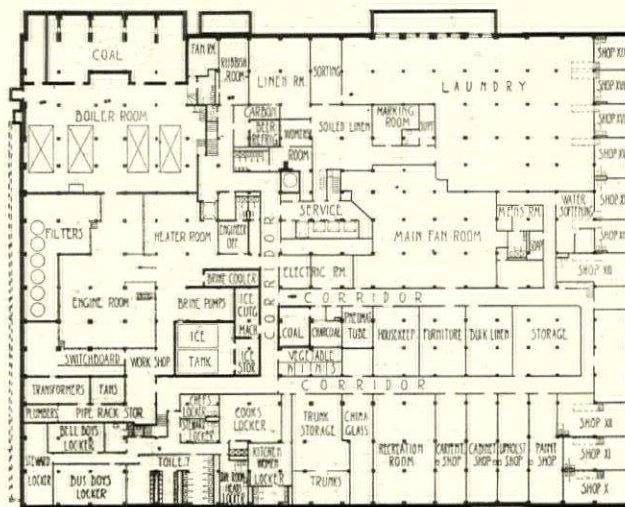
NINTH FLOOR PLAN



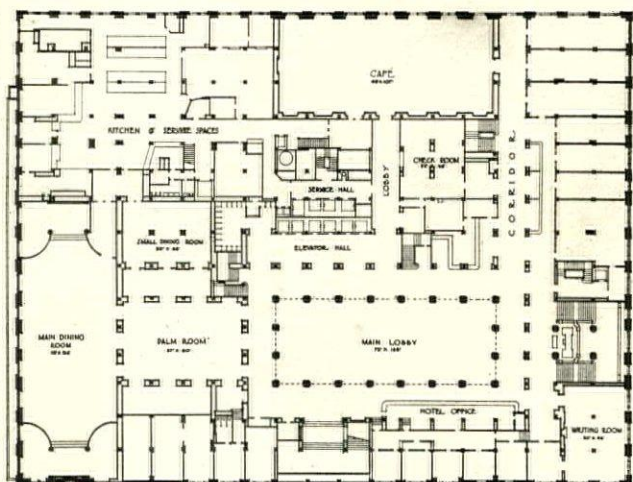
MEZZANINE FLOOR PLAN



TYPICAL FLOOR PLAN



BASEMENT FLOOR PLAN



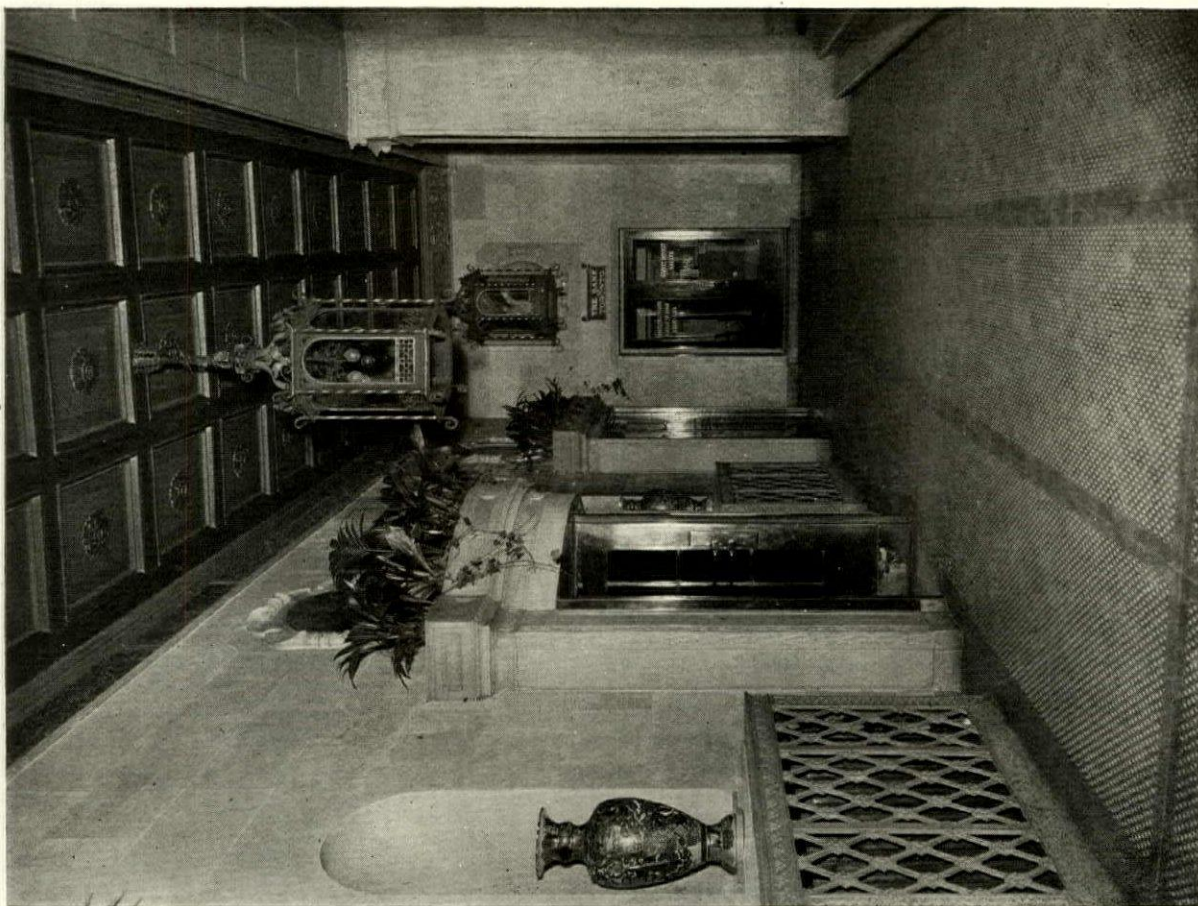
FIRST FLOOR PLAN





VIEW ACROSS MAIN LOBBY

MOUNT ROYAL HOTEL, MONTREAL  
ROSS & MACDONALD, ARCHITECTS



MAIN ENTRANCE LOBBY









DETAIL AT END OF MAIN DINING ROOM  
MOUNT ROYAL HOTEL, MONTREAL  
ROSS & MACDONALD, ARCHITECTS









PALM ROOM



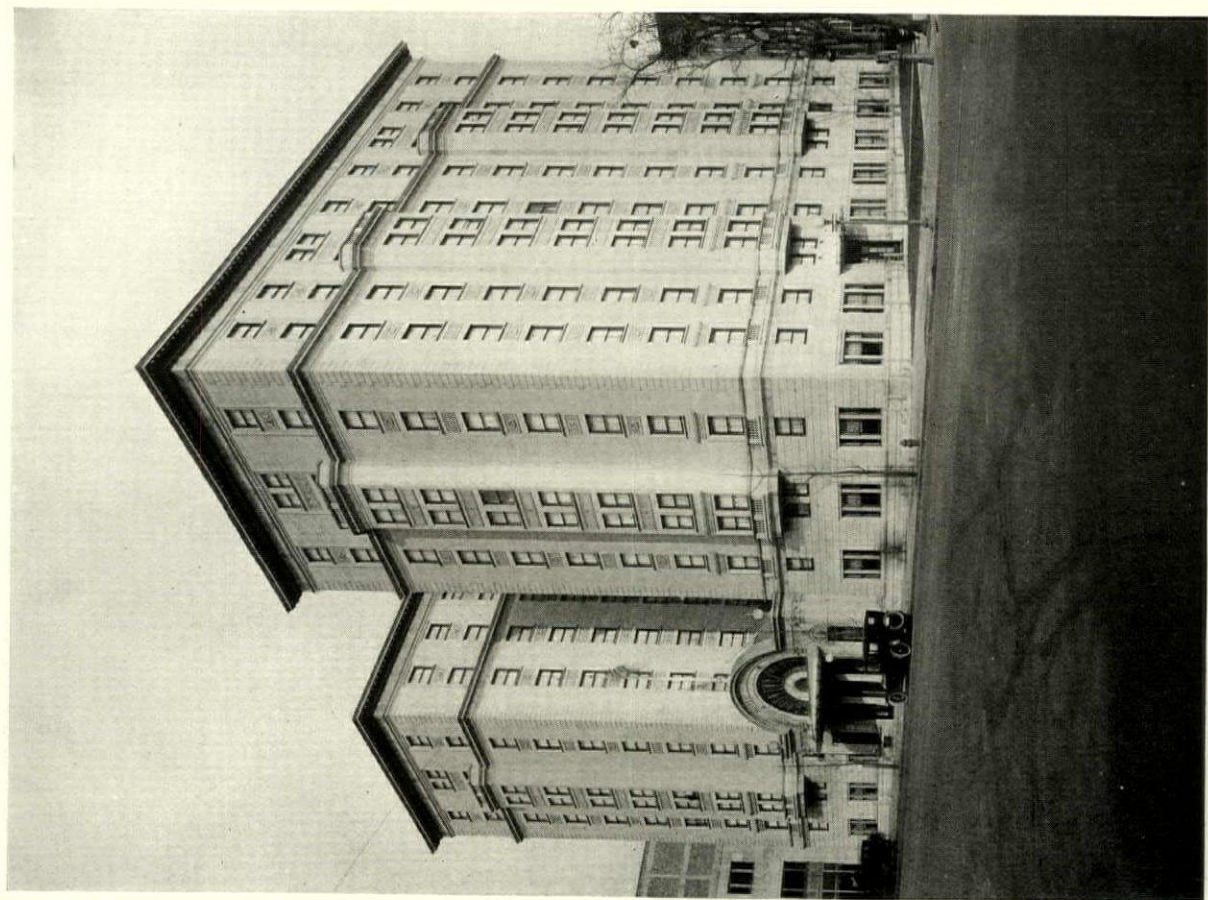
GRILL ROOM

MOUNT ROYAL HOTEL, MONTREAL  
ROSS & MACDONALD, ARCHITECTS



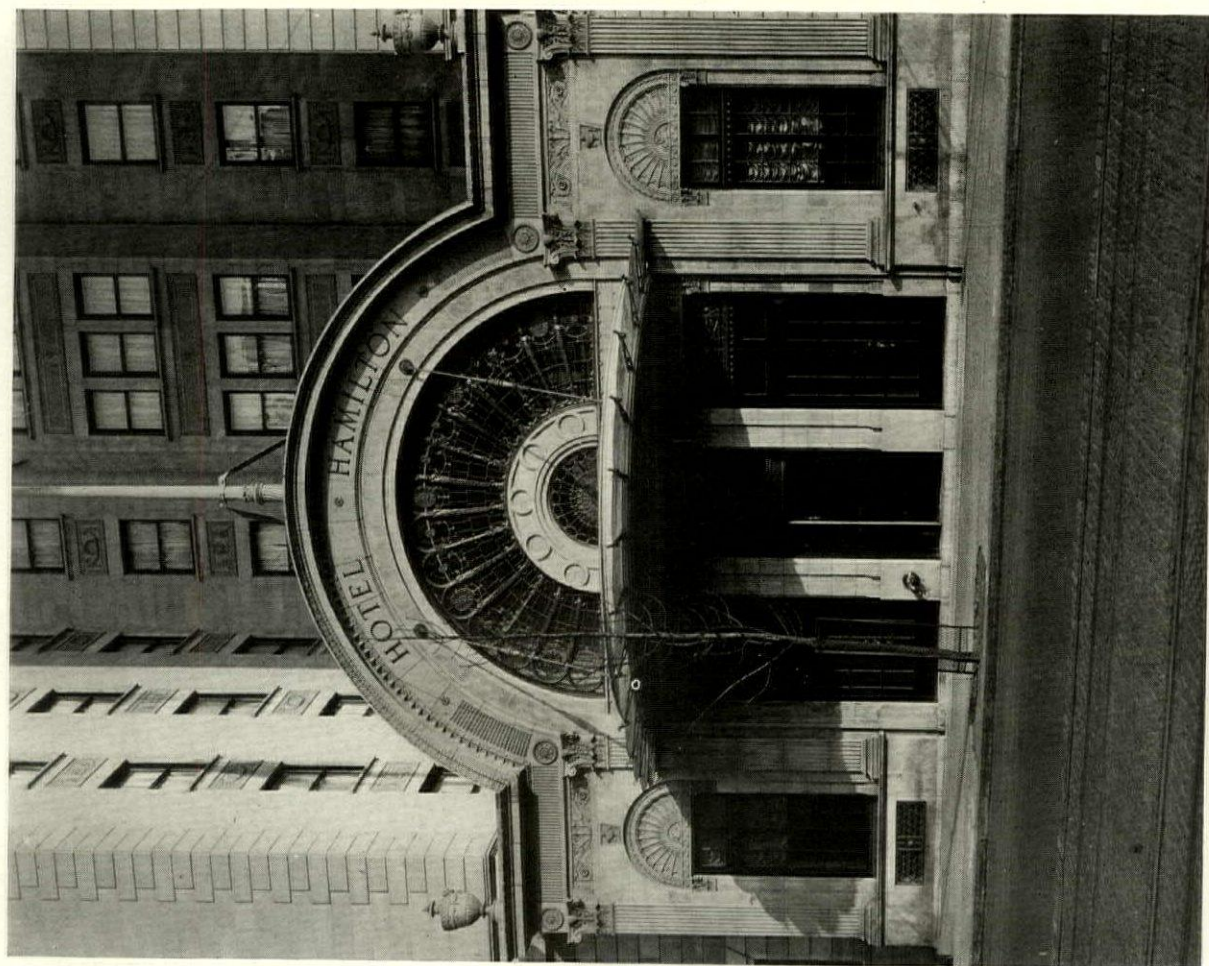






GENERAL EXTERIOR VIEW

HOTEL HAMILTON, WASHINGTON, D. C.  
J. H. DE SIBOUR, ARCHITECT



DETAIL OF ENTRANCE

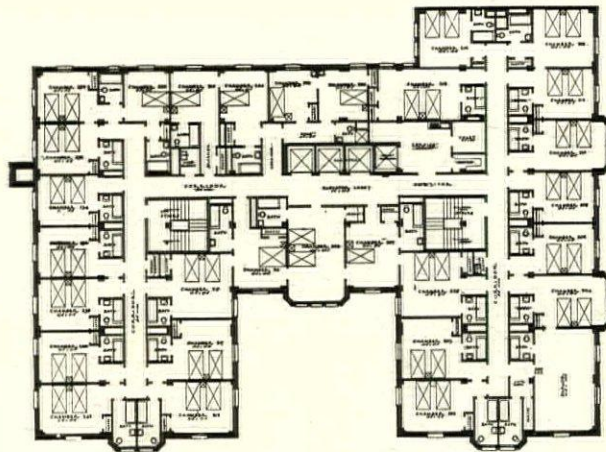


## HOTEL HAMILTON, WASHINGTON

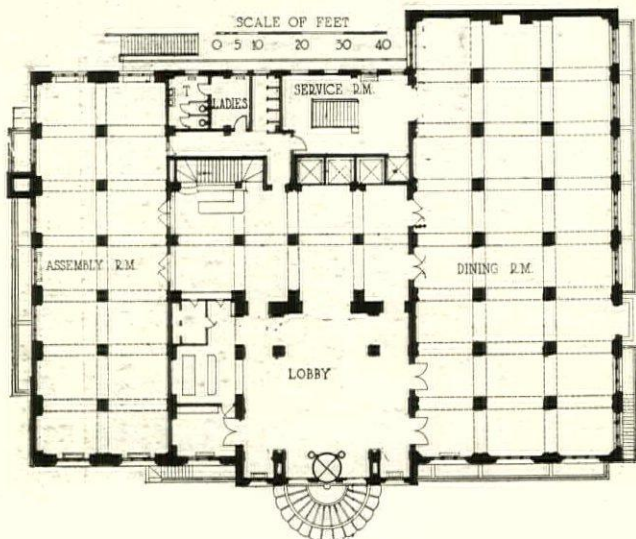
Illustrations on Plates 89 and 90

The Hotel Hamilton has been designed to afford distinctive service in Washington. It contains 350 guest rooms, each with private bath. The main dining room seats 400, and there are in addition three private dining rooms seating 60 each. There is one main kitchen, a service kitchen for each private dining room, and a service pantry on each floor.

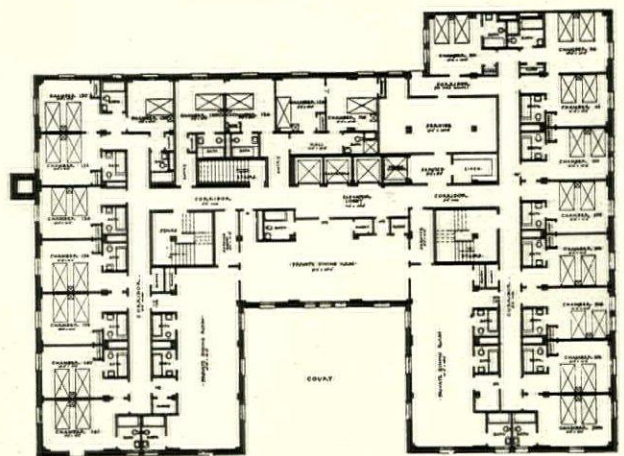
Construction is steel frame with reinforced concrete floors; exterior materials, Indiana limestone and terra cotta. The interior is executed in plaster in Adam style. Heating is by low-pressure steam vapor system; power from central station. Mechanical equipment includes 36,000 cubic feet ventilation for kitchen, etc.; 12,000 cubic feet air washing for public rooms, 7½-ton refrigerating plant, and portable vacuum cleaning system. Total contents of building is 1,450,000 cubic feet; completed December, 1922.



TYPICAL FLOOR PLAN



FIRST FLOOR PLAN



SECOND FLOOR PLAN





LOBBY



MAIN DINING ROOM  
HOTEL HAMILTON, WASHINGTON, D. C.  
J. H. DE SIBOUR, ARCHITECT







# The Architect's Business Contact with Hotel Projects

By C. STANLEY TAYLOR

A COMMISSION to an architect to design a new hotel may be received from any one of four sources. Such commissions divide themselves into four classes; presented in order of experience these are:

1. Projects which are brought to the office directly by clients, or through their recommendation.

2. Projects brought to the architect by promoters, in the preliminary stages of which the architect is asked to co-operate.

3. Projects subject to competition or direct sales effort on the part of the architect.

4. Projects which from a business viewpoint originate in the architect's office.

Two of these sources of hotel work in the architect's office are interesting in that a method of procedure is involved different from that to which the architect is usually accustomed. The first of these is working with promoters of hotel projects. It is said in hotel circles that only about 5 per cent of hotel promotions which are undertaken ever reach the stage of construction. The first step which the promoter of a hotel enterprise takes is usually securing an option on the proposed site and a tentative plan of the proposed building with perspective sketches for publicity and sales literature. Naturally, the promoter will endeavor to obtain this material from an architect on a gambling basis, toward which the architect must devote a certain amount of his time and knowledge to creating the most favorable basis for leasing and selling bonds or stock for the financing of the project in hand. This creates a situation in the consideration of which the architect cannot afford to be arbitrary. He cannot gamble with every suggested promotion, nor can he consistently turn down all such propositions which may be suggested to him.

The proper procedure is a careful investigation as to the antecedents of the promoters and the logic of their enterprise:

Who wants the hotel?

Is the community behind it?

Has some of the equity financing been provided?

Have these promoters ever put through a similar proposition?

Is the site a logical one?

Is there a definite community need for such a building?

These and similar basic questions are those which the architect should ask himself, the promoters and the leaders in the community before he commits himself to any program wherein he is called upon to invest actual money and valuable time on a contingent fee basis. His part in hotel promotion should be undertaken very seriously. It is not sufficient to dash off an approximate plan and sketch.

If the enterprise is really to be brought to a successful conclusion, careful study should be made with a realization that plans and outline specifications will almost immediately be submitted to a mortgage company for a building and permanent mortgage and then to the investing public as a basis for the sale of bonds and stock. They will also be submitted to logical lessees or to a newly formed operating company for the determination of approximate rentals. Also, where rentable space in the form of sub-leases is provided, the plans will be submitted to business men who may be interested in operating the shops and concessions.

Thus the preliminary plans receive the consideration of a number of experienced and practical hotel operators, mortgage financiers, realty experts and the business men of the community. If the plans do not provide for a logical investment and a proper return, the venture will fail at that point, and the responsibility will lie primarily with the architect. On the other hand, these preliminary plans if properly developed may serve to insure the successful passing of the promotion stage.

Similarly, it is quite possible for the original idea of a hotel project to first develop in the architect's office and be presented by the architect to a professional hotel promoter, to the local chamber of commerce or to local real estate interests. The most logical development by the architect of an original hotel investment idea is the presentation of such a suggestion to the owner of an important undeveloped building site. A number of hotel projects owe their origin to this form of constructive imagination on the part of architects or members of their organizations.

Another business contact which the architect should seek to develop or which should be accepted and maintained in an understanding spirit is his relationship with large mortgage financing organizations, particularly the underwriters of bond issues. Here it will be found that all contracts for the financing of hotel projects carry a clause which permits the underwriter to have full and final approval of the plans and specifications of the building. As soon as an architect knows that the owner is negotiating with such an underwriter or has closed a financing contract of this nature, an offer of close co-operation in planning under the supervision of the underwriter's service department or consulting architect should be forthcoming from the original architect on the project. This form of co-operation will be appreciated and, without mincing matters, it may be said that if it is not forthcoming it will be forced. It is a great mistake for architects to hold themselves aloof from various important business considerations involved in the development of a



hotel project, and it is similarly a mistake for an owner to withhold from the architect his confidence regarding the financing of the operation.

It may be said that in addition to the requirements of good architectural design, which are established for any important building of an institutional or public service nature, the hotel project is highly complicated by the fact that it is primarily a problem of investment in which every element of planning, construction and equipment has a direct bearing on its ultimate success from a business viewpoint. There is probably no type of building which demands from the architect such comprehensive knowledge and study in order that he may create plans affording at once architectural excellence, a minimum cost of first investment, the highest earning power and the lowest maintenance cost consistent with the established management policy.

The average hotel project, regardless of its location, is subject to certain primary considerations and logical business tests which may predicate success or failure from the investment viewpoint. These factors are considered in detail in another article in this issue (*The Economics of the Hotel Project*), but it may be said in general that the purchase price of the land must bear a sound ratio to the cost of the building which is to be constructed; that through the medium of room rentals, concessions and other income-earning activities there must be established an unquestionable gross income which in turn indicates the amount of money which can be expended for land and building; and that the hotel must be deliberately planned to meet carefully analyzed requirements, not only of the traveling public but for the accommodation of local activities and interests.

In the preliminary consideration of plans for a new hotel, it is well to think of the building as a new machine designed for a very definite type of production which in turn must be sold to the public. In the construction and equipment of this machine there must be no part which does not *work* and so add its quota to the earning power. The production expected from the operation of this machine is *satisfactory service to the public*. Each part must be so geared up that the result will be smooth operation at the lowest consistent operating cost. There must be no weak parts which within a few years will require costly replacements and contribute to high maintenance costs.

It will be argued immediately that the architect cannot usually be expected to maintain within his own organization the business and engineering knowledge and experience necessary for the complete development of a project of this nature. This is quite true, and one of the first demands of the architect who would undertake a hotel project is that he understand the importance of bringing in experienced consultants who will co-operate with him to insure the success of his plans. The important elements of consulting service which should be considered include the close co-operation and

supervision of planning by a practical management organization or an individual thoroughly familiar with the operation of a hotel of the type under consideration. This consulting service will in many instances be available through the owner, who himself may be a practical hotel man or who may have an operating organization. If this is not the case the importance of arranging with the owner to appoint his manager before plans are drawn cannot be too strongly emphasized, or if this cannot be done an expert in the organization and management of hotel projects should be brought in on a fee basis.

The complex problems of mechanical equipment and special equipment such as that of kitchens and laundries should also be placed in the hands of consulting engineers unless the experience of the architect's own organization is such that these phases of planning and equipment can be handled successfully and on an economical basis. It is, of course, to be remembered that many manufacturers of special equipment of a mechanical or service nature have engineering departments highly skilled in laying out installations which come under this heading. In many instances this service is of so complete a nature that from the architect's viewpoint it is highly dependable and serves to relieve him of much detail responsibility.

Perhaps it may be suggested that the determining point in this consideration might be established by the amount of money which is to be invested in the particular installation in question and by the complexity of the installation problem. The consulting engineer is naturally unbiased and seeks primarily to solve the problem of equipment and its installation in a manner at once economical but insuring dependable service, long life and low maintenance cost.

Similar problems arise in connection with interior decoration and furnishing, and conditions similar to those of mechanical and service equipment installations may be said to exist. Many architects' offices are thoroughly organized and equipped with knowledge to carry out the complete decorative and furnishing scheme. This, of course, involves much detail, and it is generally found more satisfactory to employ professional interior decorators who will work in harmony with the architectural designer, giving joint consideration to the selection of fabrics, furniture, floor coverings and other elements of interior decoration. Again, in this field it will be found that a number of reputable manufacturers maintain experienced service departments ready to co-operate with the architect or to work with both architect and decorator toward the insuring of satisfactory results. In working out the scheme of interior decoration and furnishing, it is of course important that the hotel manager or practical adviser be brought into close conference, particularly in the furnishing of guest rooms and dining rooms. He should also be present at conferences where the equipment of kitchens and other forms of service equipment are finally determined upon.



# The Hotel for the Typical American City

By W. L. STODDART, *Architect, New York*

THE backbone of the hotel industry in the United States is formed by the commercial hotel, represented by hundreds of buildings of varying degrees of merit and ranging from 50 to 300 rooms in capacity. The importance of the small hotel in the aggregate may be seen from a recent survey of hotels in this country; of a total of 22,196 hotels, 16,522 are of 50 rooms or less, and 5,046 are of between 50 and 200 rooms.

Today the great majority of smaller hotels are community enterprises. The need for a hotel is felt by the business interests of the city, and through a committee of prominent merchants, manufacturers, etc., backed up by the local chamber of commerce, the problem is undertaken. In the natural course of events, these men are without experience in the hotel owning or operating field, and the most important consideration at the outset is to secure intelligent advice. The most effective and logical thing to do is to bring in at this point the lessee or operator of the hotel. Since it will be largely due to his management whether the hotel is a success or not, it is important to be assured that in its arrangement and equipment his ideas are complied with.

The first point that comes up for decision is the size of the hotel. In this the hotel lessee should be the most capable judge. Supplementing his opinions, it is well to secure the ideas of the outstanding local retail merchants, because they have a direct knowledge of the community's buying power. The business men will also be able to indicate fairly closely the amount of patronage to be expected from commercial travelers. The character of the city will, of course, determine this largely. In an industrial section there will be less patronage of this type than when the community is a trading center. The patronage from the townspeople themselves and the stimulus that a new hotel will provide the city's commercial and social activities should not be overlooked.

The relation of the surrounding country to the city is also an item of importance. If the city is on a main line railroad or if a popular automobile highway passes through it, the hotel can be larger than if the city is not so favorably situated. Given these advantages of location and, with a modern hotel, a city becomes a logical convention center.

It is not wise to draw comparisons between cities of similar populations in determining the capacities of hotels because of the varying local characteristics even in cities of the same size. The existing hotel accommodations in a city should, of course, receive serious consideration. The size of the new hotel should not be affected in any degree by existing hotels unless at least one of them is entirely modern.

It is the experience in most cities that a new hotel not only creates business for itself but creates business for all the hotels in town, and it is also generally true that a new hotel is an element of importance in increasing the population of the city.

In determining the size of the hotel, I would make three recommendations. First, it is not a sound financial proposition to build a modern fireproof hotel of less than 150 rooms, since because of the public space required in a hotel of any size it takes this minimum number of rooms to produce sufficient revenue to insure the interest on the investment. Second, it is a safer business proposition to build conservatively and allow for future expansion. It is in the province of the architect to make this provision in his original plans, but he must, of course, be given definite indication from the owner as to the probable future needs. Third, the possibility of store rentals as additional revenue to the hotel owner should be definitely considered and will largely affect the selection of site. This revenue should be equal to the interest on at least 25 per cent of the cost of the building or, in other words, should equal the taxes and interest charges on the property or, if the property is leased, the annual rental charge.

Selecting a site for any hotel is a matter of serious concern, but it is of the greatest importance in the case of a small commercial hotel. There are in general four classes of people whose opinion in regard to the site should be carefully weighed. These are the prospective lessee, the architect with experience in the building of hotels, the city's leading retail merchants, and officials of the chamber of commerce. The particular points that should determine a site are its accessibility to railroad stations, street car lines, automobile highways, the city's business district, and the residential section. If the hotel site is selected with reference to these factors, the question of revenue from sub-rentals will automatically take care of itself.

If the indicated return from store rents can definitely be assured, the cost of the site selected is of secondary importance. The best site should be selected, regardless of cost, and the income from sub-rentals adjusted to carry the cost of the property. The best location for a new hotel is one that is conveniently close to or even directly in the line of growth of the city's retail business and at the same time on the main street leading out toward the residential center. The retail center of a city follows the trend in residential building, and it is better to choose a site with which the business district will catch up than to locate a hotel in the immediate business center with the possibility of its being left



behind in the course of a few years' rapid growth.

Adapting the hotel plan to a city's requirements can be done only after a careful study of the type of hotel service that will be demanded. While it is frequently said that a hotel cannot be called modern unless every room is provided with a private bath, it is obvious that all of the traveling public has not arrived at a point where this is demanded, and the successful commercial hotel should be in a position to meet the demands of a varying patronage. The provision for guest rooms should therefore be sufficiently elastic, so that the commercial traveler who wishes to keep down expenses, the tourist and the attendant at conventions can all be accommodated.

Every room in a hotel should have toilet facilities and a lavatory. The bath can be omitted, but there is no necessity for providing public baths on the typical floors to serve patrons of these rooms. As a matter of actual space utilized there is no gain in providing public baths and toilet rooms for men and women to serve the few rooms on a floor that would not be equipped with private baths. An actual instance of this is seen in the case of remodeling a hotel in a southern city which originally had from 50 to 60 rooms without baths. One hundred thousand dollars was spent in equipping these rooms with private baths, and even with the added space required for bathrooms 14 additional guest rooms were gained. The new arrangement, of course, pro-

vided rooms slightly smaller than those originally built, but entirely suitable for modern conditions. Every room in a hotel should also be provided with a closet if possible.

From the standpoint of economy in construction, as many of the floors as possible should be alike. It is, therefore, necessary to plan the typical bedroom floor so that a proper proportion of each of these kinds of rooms will be incorporated. The larger rooms that tourists will require can be located at the corners. The smaller rooms, with possibly lavatories and toilets only, can be located on the courts, and the tiers of typical rooms and baths occupy the street frontages of each floor.

For the typical hotel in a city of 20,000 to 50,000 population, in which the patronage will be chiefly commercial in character, I would recommend these sizes for bedrooms:

Court rooms,  $9\frac{1}{2}$  to 11 feet wide by 14 to 15 feet deep.

Rooms on street frontages,  $10\frac{1}{2}$  to  $12\frac{1}{2}$  feet wide by 16 feet deep.

Corner rooms, 13 to 14 feet wide by 16 feet deep.

A practical ceiling height for a hotel of this character is one that measures 10 feet from floor to floor.

There is an advantage in arranging some of the corner rooms en suite. Tourists frequently demand larger accommodations than do traveling men, and



View of Lobby from Ball Room Foyer, Lycoming Hotel, Williamsport, Pa.  
The dining room is at far end, screened with glass partitions to make expansion possible

W. L. Stoddart, Architect





Lobby Lounge, Penn Harris Hotel, Harrisburg, Pa.

The dining room is at the far end screened with low plant boxes, and can easily be arranged to meet changed conditions. This is typical of the flexible public space plan

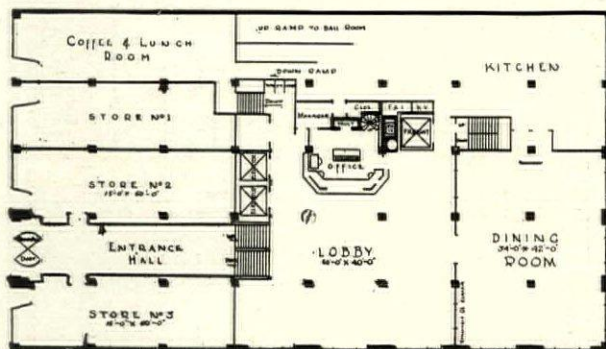
W. L. Stoddart, Architect

in developing the business of a new hotel such a combination of rooms offers opportunity of securing desirable patronage in the way of winter leases from residents of the city. This business offers the management a steady income until such a time as transient business develops, when these rooms can be used for single occupancy, since a larger percentage of profit is in that type of patronage. The proportion of single and double bedrooms can generally be determined satisfactorily by furnishing all the street front and corner rooms with twin beds and the court rooms with single beds.

A proportion should also be worked out between tub baths and shower baths. There is, unfortunately, an impression among the traveling public

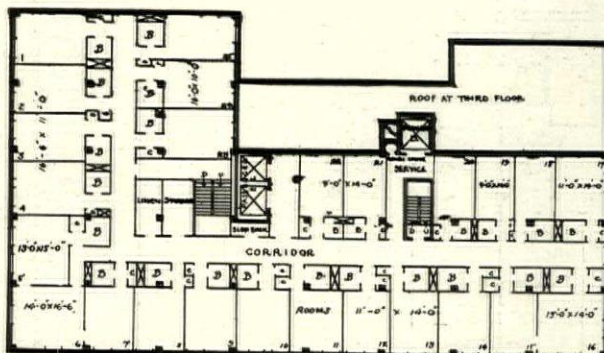
that the shower bath represents less expense to the hotel, and there is consequently a demand for shower baths on the part of those persons who economize. As a matter of fact, if the shower bath is properly installed it equals and often exceeds in cost the tub bath, and from the point of operation it is frequently more expensive. To meet this demand 10 to 15 per cent of the court rooms should be equipped with shower baths.

In cities where trade is an important element there will be need for sample rooms to accommodate commercial travelers. It is difficult to gauge the number of these to provide because they will be unoccupied during certain seasons of the year, and they consequently represent a drain on hotel profits. A com-



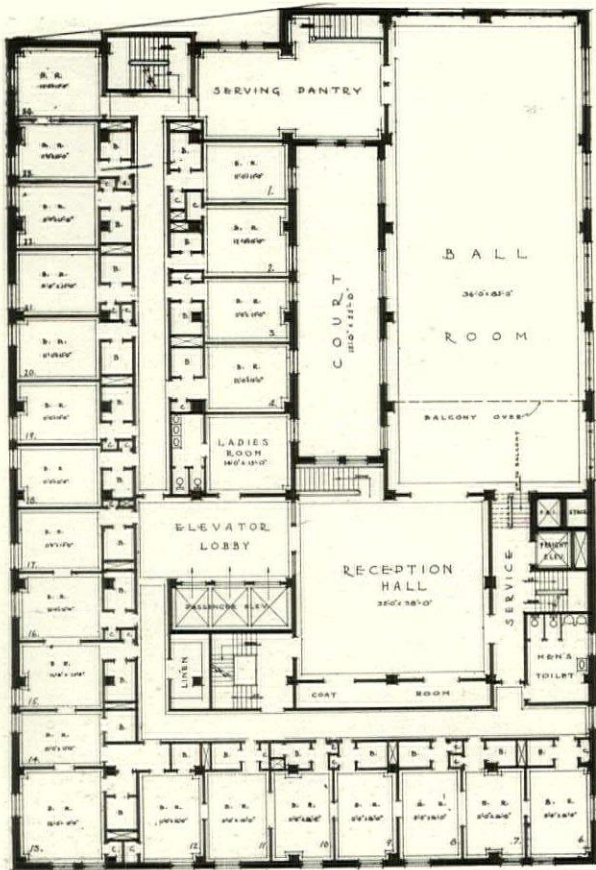
This typical first floor plan shows a desirable location for the coffee room and convenience of kitchen location

W. L. Stoddart, Architect

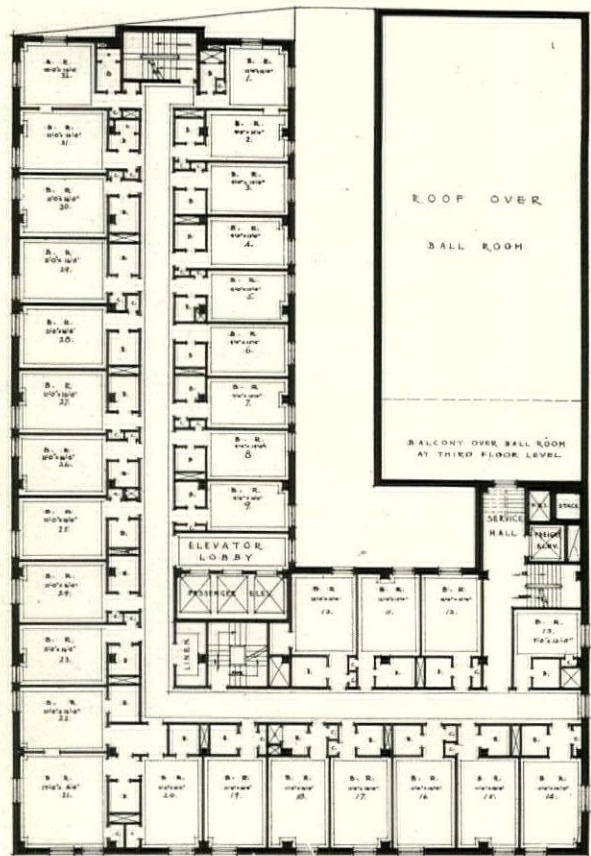


Typical guest room floor to show practical first portion. Future business can be provided for in additional wing at the right

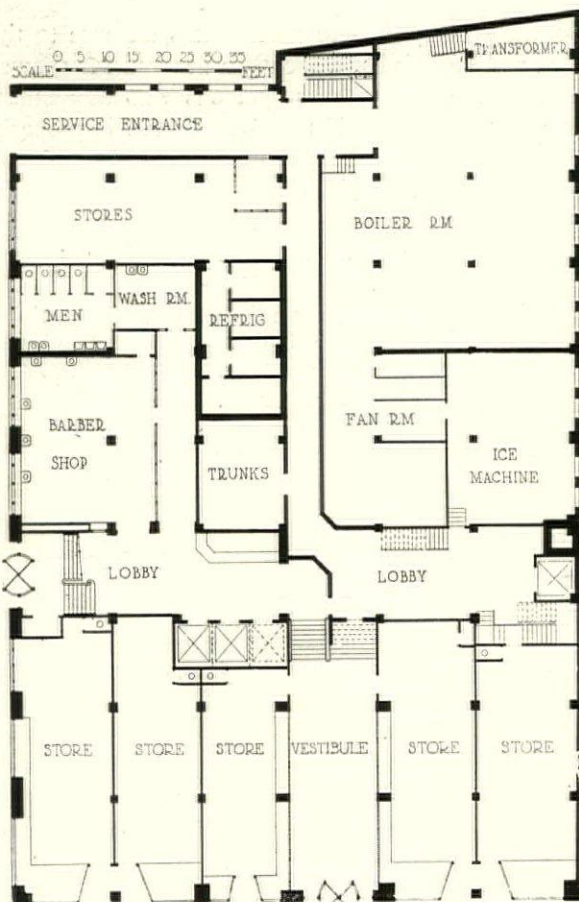




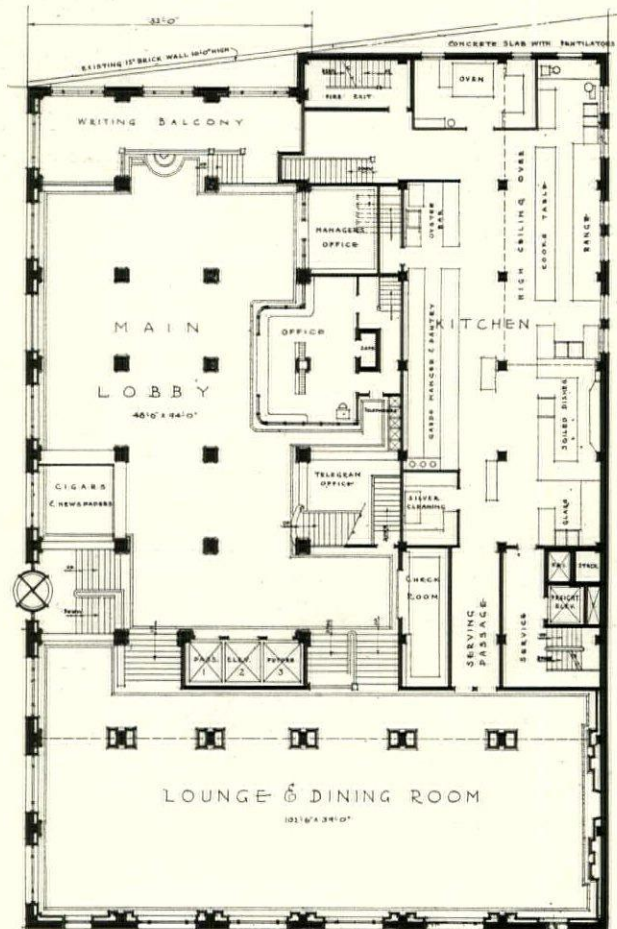
SECOND FLOOR PLAN



TYPICAL FLOOR PLAN



GROUND FLOOR PLAN



FIRST FLOOR PLAN

A TYPICAL HOTEL OF 300 ROOMS; THE FRANCIS MARION, CHARLESTON, S. C.

W. L. STODDART, ARCHITECT



promise should therefore be reached by planning them with a view to utilizing them as bedrooms. The type of disappearing bed that folds into a closet is satisfactory equipment for the traveling man, and at the time of conventions and other peak loads the rooms can be furnished as regular guest bedrooms, or else cots can be used. In the small hotel it is probably better to arrange these sample rooms near the service elevator on each floor rather than to provide an entire floor of sample rooms, because of the greater elasticity that the former scheme provides.

Convenience of service should not be overlooked on the typical floor. It is essential to incorporate a slop sink closet, a linen closet for the daily floor requirements and whenever possible storage for cots. Laundry and rubbish chutes will contribute to better service, reduce the number of maids and relieve the elevator.

In planning the public portions of the small hotel every effort should be made to conserve space. The various dining rooms that the type of patronage indicates as necessary should, whenever possible, be so located that they can be served from the main kitchen. The kitchen and main dining room should be placed on the lobby floor level or slightly above it. An important feature of this type of hotel is the lunch room or coffee shop. This should be given the best street front location on the ground floor that is accessible to the kitchen service, and the connection can generally be accomplished by means of a ramp.

The simplest and most logical scheme for meeting the small hotel's need for public space is a large room planned in conjunction with the lobby that can be so screened off as to serve different purposes. When a lot is of such dimensions that a frontage of 100 to 125 feet can be had, a lounge space covering this area, raised a half-story above the lobby and located directly over the street front shops, meets the conditions admirably. One end can be used as a dining room and the other end for a general lounge, and there should be separate staircases from the lobby to each section so that they can be used independently. If the restaurant service increases it is a simple matter to extend the temporary screens to gain the required space. Similarly, the dining space can be contracted so that there will not be an empty appearance as happens when a



Exterior, Francis Marion Hotel, Charleston, S. C.  
The lounge lobby extends the entire frontage over the stores  
W. L. Stoddart, Architect

large separate room is provided and the expected patronage does not develop. With this arrangement, the lobby is in the center of the building and serves simply the commercial end of the hotel, the lounge space providing the social end.

In small hotels, where conventions are not a regular part of the business and the demand for space for them is irregular, this same lobby-lounge can be devoted to entertainment purposes. In this event, a large storeroom on the same floor level is necessary in order to store the furniture that has to be removed from the lounge. In planning the working lobby of the small hotel, certain provision should be made for small concessions, such as cigar stand, newsstand, flower shop, etc., but the rental returns from these spaces are not sufficiently great to require any special attention being given to securing advantageous locations for them.

A determination of space for private dining rooms and a ball room will depend entirely on the business and social activity of the city. At best, the question of installing a ball or assembly room, particularly in the typical hotel of 100 to 200 rooms,





BALL ROOM



LOBBY

GEORGE WASHINGTON HOTEL, WASHINGTON, PA.  
W. L. STODDART, ARCHITECT

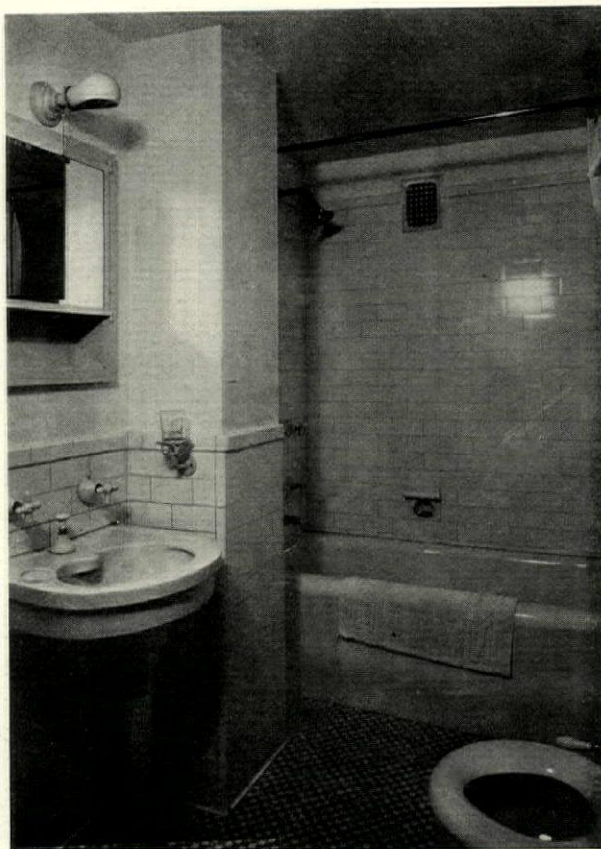


is a difficult one. If conventions are to be sought, a room of this character is always necessary, and if local activities, such as Rotary and Kiwanis Clubs and social functions can be depended on, the space will show a fairly regular use. In any case, the ball room should not be located in valuable space that can better be used for other revenue-producing purposes. If a guarantee of patronage for the private dining rooms can be secured in advance, this will be valuable in determining their number. It is well in any case to have them grouped together, so that they can be turned into one room for larger functions. They should be placed in the building also with careful relation to the kitchen service. Except in special cases, I believe it is a mistake for a hotel that is primarily commercial in character to provide a roof garden.

Passenger elevators should be grouped together, but in the small hotel it is not necessary that the service elevator be in the same bank. One passenger elevator should be installed for every 100 guest rooms. The service elevator should be placed in such a location that it will serve with equal facility the kitchen and the rear entrance for the handling of trunks, etc. It is generally planned in conjunction with the service stairs and, provided a corridor or passageway is arranged for access to it from the lobby, it is not necessary to have it adjoining the lobby. One service elevator in the average small hotel is sufficient.

There is very little room food service required in a hotel of this type, and the service elevator will take care of any calls. There is therefore no need for providing dumbwaiters. If the kitchen is properly located with respect to the various dining rooms there is also no need of dumbwaiters or dish conveyers common in the large hotels.

The kitchen should be as large as the main dining room and on the same level with it. If it serves a banquet room on a floor above it, it is only necessary to have a good staircase with a pantry at the head of it. The food is taken up in bulk from the kitchen on the service elevator to the pantry for serving.

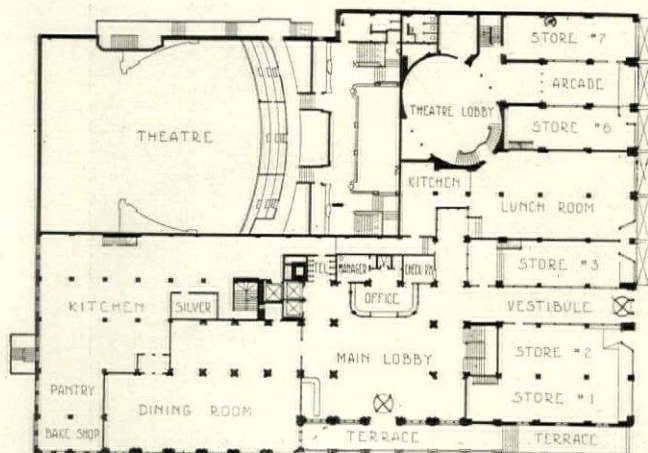


A typical bath room in the smaller commercial hotel showing character of fixtures and accessories

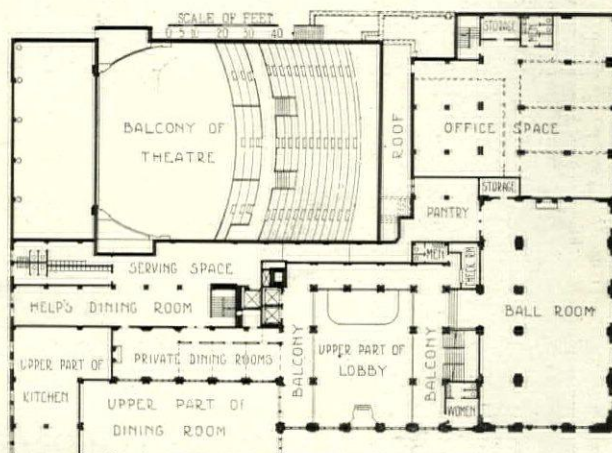
Incorporating the laundry in the hotel of from 100 to 300 rooms is a matter on which lessees have divided opinions. In general, however, it is preferable to have the flat work done in the hotel if the finances will permit. For a 200-room hotel the cost of a satisfactory installation would be in the neighborhood of \$12,000. A hotel of this size would of course not undertake any laundry service for guests.

Mechanical equipment should be reduced to the minimum because of the cost of operating and main-

Note: Additional plans and illustrations of the George Washington Hotel appear on Plate 93.



First Floor Plan



Mezzanine Floor Plan

George Washington Hotel, Washington, Pa.  
W. L. Stoddart, Architect



tenance. It is necessary to have forced ventilation in the kitchen, and this would be provided by ducts for the inlet of fresh air and exhaust ventilation from the hoods over the ranges. The rooms in the basement, such as barber shop, billiard room, grill room, etc., are generally so closed in that artificial ventilation here is necessary. To provide fresh air is sufficient; the exhaust will take care of itself. The only additional rooms requiring exhaust ventilation are the bathrooms, and this is accomplished by means of exhausting the shafts which are connected up with a large exhaust fan at the top of the building. The modern method of installing bathrooms in a hotel of any size is to group them along the corridor walls with a pipe and air shaft between each two rooms. This makes it possible that the ventilation be simply worked out.

Very few hotels of 300 rooms or under are equipped with their own power plants. It requires the employment of skilled men, and the cost of the service proves too expensive. In most cities satisfactory arrangements can be made with the local electric service companies to provide electric current at reasonable cost for elevators, motors, illumination and other needs.

A certain amount of steam is needed in the kitchen, and this is provided for by putting in high-pressure boilers tested to 100 to 125 pounds and equipped with reducing valves to bring the steam down to the pressure required for the various uses.

In this way there are no problems of handling exhaust steam, and the heating of the building is accomplished by installing an auxiliary low-pressure boiler. Water is heated in a boiler equipped with copper coils and fed with steam from the high-pressure boiler. About 40 pounds steam pressure is required for the kitchen, and from 40 to 50 pounds for the laundry.

Refrigeration is provided by the installation of automatic plants where boxes are set to a certain temperature; when this temperature is reached the plant automatically shuts down and does not need any attention. The plant is operated by an electric motor, and the ammonia system is that generally selected. This plant can also be equipped to make from one to two tons of ice daily, which will meet the requirements of the average hotel. Similarly, it can be enlarged sufficiently to take care of running ice water in the guest rooms. An important point in refrigeration is the insulation of the pipes, particularly those supplying ice water. They should of course be kept away from steam risers, but with asbestos, composition or cork covering of sufficient thickness they can be accommodated in the bathroom pipe shafts without any great waste of cold.

The planning of a successful modern hotel, whether in a large city or a fairly good-sized town, is work to which the architect must bring his best skill, together with all the vision and experience which he and his organization can command.

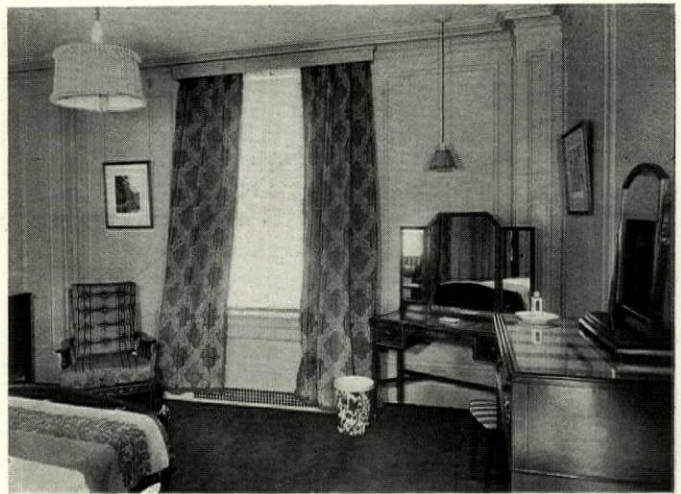


Lunch Room, George Washington Hotel, Washington, Pa.  
W. L. Stoddart, Architect



## Typical Private Room Interiors

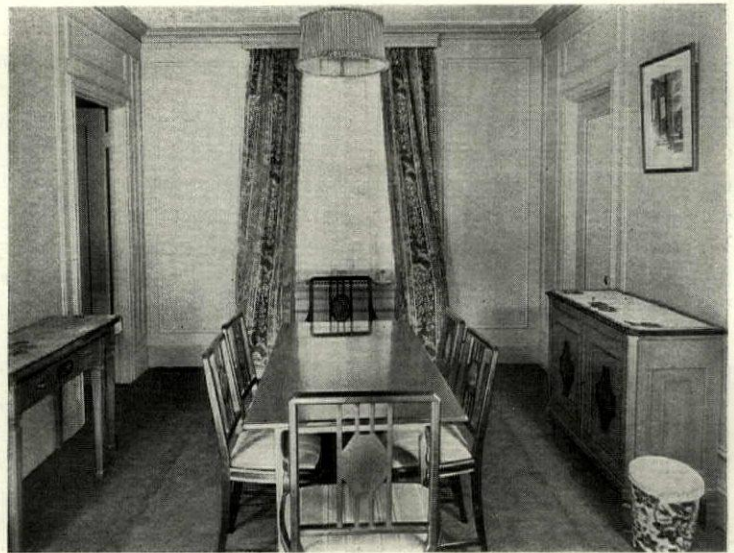
*THE decoration and furnishing of hotel guest rooms have in the past few years been greatly improved in their approach to the simplicity and refinement of the private house. A large portion of the traveling public today appreciates simplicity, and hotel managers have endeavored to meet their desire. The hotel room has made great progress toward cleanliness and sanitary qualities in the elimination of plush and velour hangings, the simplification of furniture upholstery with the use of firmer fabrics, and the elimination of dust-catching stuffs from the walls. Painted plaster walls seem to be preferred to wall paper; they are sanitary, and have the advantage of appearing cool in summer, and with proper coloring and the accent of attractive hangings, warm and homelike in winter.*



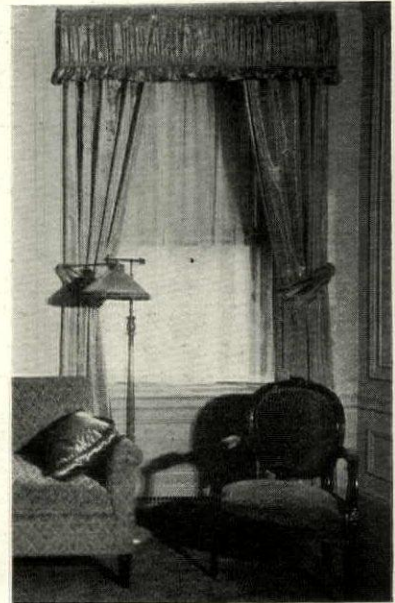
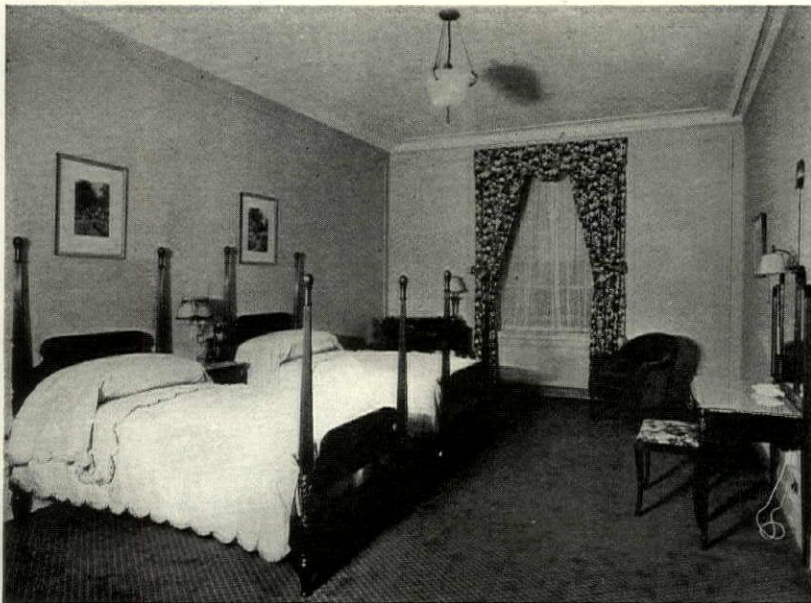
Los Angeles-Biltmore Guest Room



Ambassador Parlor



Los Angeles-Biltmore Dining Room



Guest Room and Detail of Parlor, Ambassador Hotel, New York



# Power Plant and Refrigeration Equipment

By J. F. MUSSELMAN, M. E.

*Consulting Engineer, New York*

**I**N discussing the matter of hotel power plants, it might be well at the outset to come to an agreement as to what is to be included. Whether or not all parts may fall within the technical limitations, we shall include, for the sake of convenience, all equipment located within the confines of the engine- and boiler-rooms, and required in connection with the generation and transmission of steam, electricity and refrigeration.

In modern hotel work, throughout the parts of the world where the climate demands heat, it is unusual for steam to be bought from outside sources, but in cases where steam is available from some central plant in the vicinity, the saving in space that can be effected by the omission of a plant is sufficient to justify the purchasing of this service, even at a price considerably above the actual cost of generating the steam, for as a rule the basement of every hotel is crowded, and every inch of it is needed for kitchens, storerooms and ventilating machinery, to say nothing of the usual custom of occupying a large part of it for grill rooms and concessions, which bring in a substantial income. To construct a sub-basement is often impossible and invariably expensive, to which disadvantages must be added the annoyance of coal and ash handling and the rather remote danger of accidents or explosions.

On this basis it might be said that the best possible power plant for a hotel, where conditions permit, is none at all. If steam is available from some outside source, it goes without saying that the purchase of electricity will also be possible; but for refrigeration, this is different, on account of the fact that the cost of the insulation of long runs of brine piping is almost prohibitive. For this reason, hotels for which refrigerated brine from an outside source is available or can be procured are so few as to be negligible.

For suburban hotels and resorts, usually located on less valuable land than is common in the built-up parts of cities, the power plant can be located to the best advantage in a building separated from the hotel proper. With this arrangement all objections are overcome. The coal handling and ash removal occur where noise is not a factor, and the rupture of a steam main or an ammonia pipe or a flywheel explosion may cause the inconvenience of a shutdown, but cannot endanger the safety of guests. An isolated plant of this kind should be sufficiently close to the hotel to make possible the economical transmission of brine for the refrigeration, and over or alongside of the plant can be located the laundry, which removes another objectionable and space-occupying department from the hotel proper.

Assuming the necessity of a boiler plant and a

refrigerating plant for a specific hotel project, the rate at which it is preferable to buy electricity from an outside source brings up a question on which the engineering doctors are sure to disagree. The number of factors bearing on the case is almost unlimited, and no two of these factors seem to be the same for any two projects. The cost of labor, the rental value of the space, the possibility of communication of noise, are each about as important as the prevailing rate for electric current and the cost of fuel.

In hotels of average size, say of 500 rooms, it is safe to assume that the electric current can be generated for approximately two cents per kilowatt hour, which generating cost includes the interest and depreciation on the plant, the cost of fuel and supplies, and the cost of all labor chargeable to the generating plant. This figure would not include, however, the rental value of the space occupied by the plant, which might be prohibitive or might be negligible. The figure of two cents per kilowatt hour is based on average costs of fuel and labor. This figure will vary with the local conditions, the efficiency of the plant and the size of the hotel, through a wide range, from less than one cent to as much as four cents. It might be said in this connection that the load factor of a hotel is surprisingly uniform and will remain within the anticipated range for a greater number of hours per day and with less variation from day to day than in almost any other kind of building. This in itself tends to reduce the cost of generating current, and also reduces the standby equipment to the minimum.

Nothing can be done in the way of estimating either the cost of generating or the cost of buying current until the maximum daily demand and the annual consumption are determined. In looking over the operating sheets of a number of large hotels it appears that the maximum daily demand for all light and power is from .35 kilowatt per room to .4 kilowatt per room. These figures allow nothing for current to operate an air-cooling plant, but on account of the fact that an air-cooling plant, if used, will only be operated in this climate for about three months of the summer, and that these three months are coincident with the period of the lowest daily demand, it is probable that the last figure of .4 kilowatt per room will be sufficient to accommodate an air-cooling system on a small scale for the dining room and grill.

Another point that will affect the maximum daily demand is the question of whether or not an electric kitchen will be used. It seems that these are becoming more popular of late and, where the current cost is low, the advisability of using electricity instead of gas or coal for ovens, ranges and grills, is



worth considering. If a complete electric kitchen and bakery are used, it will add to the maximum daily demand probably 25 per cent and will increase the size of the plant in about this same proportion.

The total annual electric consumption of a hotel can best be expressed in terms of annual consumption per room, inasmuch as the current used for the lighting of public spaces, for the laundry and miscellaneous power and for the ventilating system will be approximately in proportion to the number of rooms. This annual current consumption per room should run from 1,700 to 2,000 kilowatt hours per room, which is enough to include all motors for elevators, an adequate ventilating system and the laundry, but allows nothing for an electric kitchen or refrigeration, which latter may be electrically driven, but is more often driven by steam.

In order to bring the current consumption down to the amounts given, it is necessary to economize rigidly in the selection of the lamps, especially in the bedrooms. There is nothing gained in illuminating comfort by using lamps of too high a wattage in the bedrooms, and the current consumption of such lamps has a decided effect on the profit-and-loss sheet. For a large room with twin beds, together with its bathroom, the total wattage of all lamps should not exceed 200 watts, and 185 watts is altogether adequate if the tone of decoration is light. For the average small, single bedroom and its bathroom, the total wattage should run between 125 and 150 watts. Another electrical waste that is common throughout the bedroom floors is the over-illumination of the corridors.

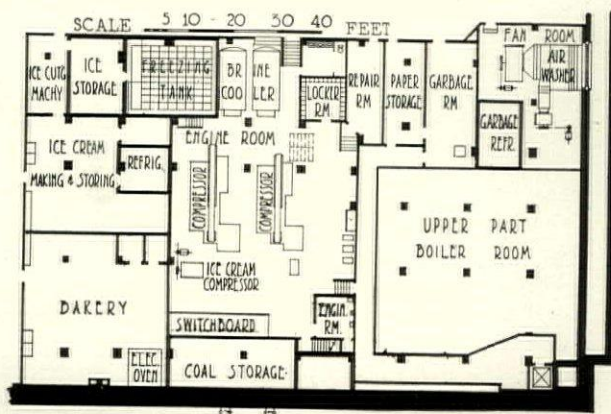
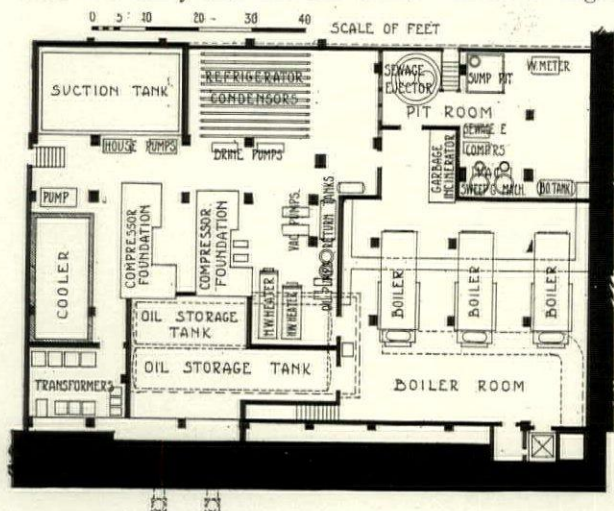
With the size of the generating plant established, the number of generating units and their sizes are next to be determined. The minimum safe number consistent with economy, where no breakdown service from an outside source is available, is three units, each having a capacity of one-half of the total maximum demand. With this arrangement, one unit will carry the load for about 6 hours at night,

the second unit operating in parallel for 18 hours. This allows one standby unit for repairs or emergency at all times.

The boiler plant of a hotel must be, in the nature of things, high-pressure, or at least medium-pressure, whether a generating plant is used or not. The kitchen equipment and laundry equipment cannot be operated successfully on low-pressure steam, and the boiler plant becomes less complicated if all boilers are operated at the same pressure, in which case the pressure of the steam for heating can be reduced in the boiler-room and supplemented by any available exhaust steam.

The size of the boiler plant, throughout the north, is more likely to be determined by the heating load than by the capacity of the generating plant, for in the coldest days of winter the exhaust steam from the generating plant and the refrigerating plant will have to be supplemented, almost surely, by live steam from the boilers. Two other items that should be taken into account in establishing the boiler horsepower are the steam used for the kitchen and the surprisingly large amount of steam required to heat the water for domestic use. The boiler horsepower required for the kitchen of a 1,000-room hotel would probably never exceed 30 horsepower, but the same hotel would consume at peak loads, in heating its hot water for baths, kitchens and laundries, not less than 250-boiler horsepower. The actual boiler horsepower required for the heating apparatus and ventilation could be estimated in a rough approximation at about one boiler horsepower for every 8,000 cubic feet of gross contents of the building.

With a boiler plant again, a three-unit plant with all units of the same size, two having a combined capacity equal to the maximum load, makes the most desirable arrangement. There is little chance of being forced to shut down two boilers of a plant for cleaning and repairs at the same time, and even if this did happen, one boiler probably could be forced to shoulder the whole load for a short while. It goes without saying that the greater the number



Plans of Two Levels of Power Plant, Hotel Walker, Washington, D. C.

Electric current is taken from an outside source, the boilers being of a self contained fire box pattern, designed for oil fuel, with provision for quick conversion for use with coal. The oil storage tanks are located under the floor of the coal room

J. F. Musselman, Engineer; Robert F. Beresford and Warren & Wetmore, Associated Architects

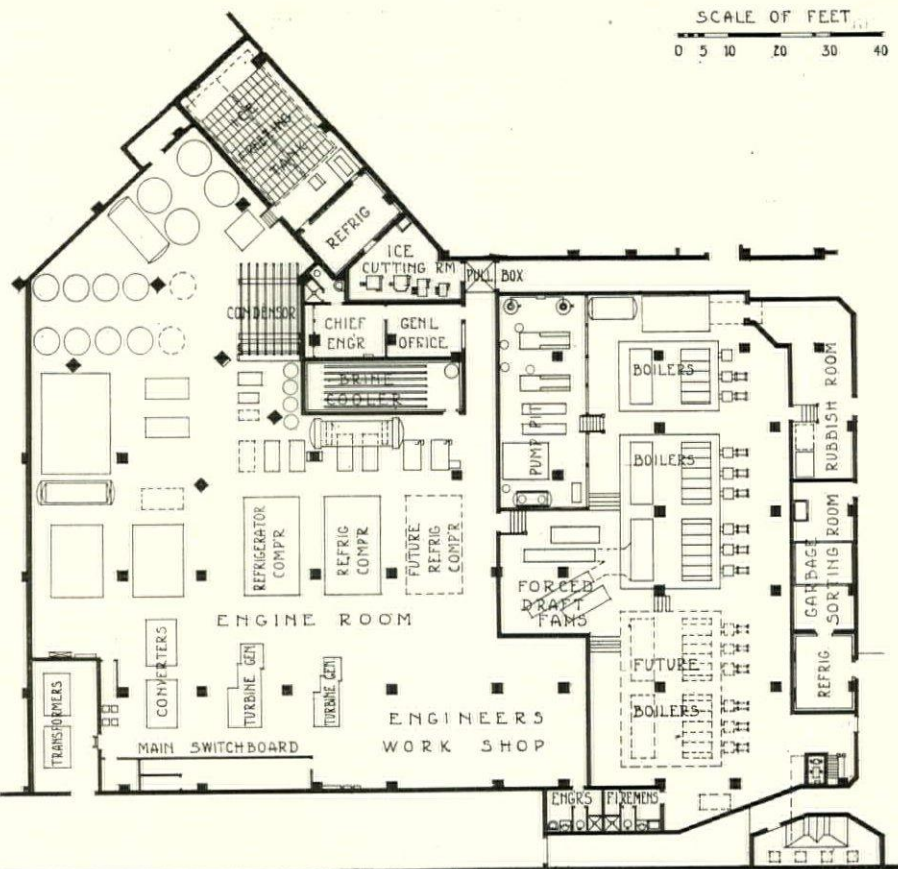


of units in the plant, the greater is the flexibility and the smaller the percentage of standby equipment. But this readily can be overdone, as the first cost of the smaller units is greater per horsepower of capacity.

The space limitations, as found, or as conceded under protest, are likely to dictate queer arrangements of a hotel plant, but, after all, the attitude that the plant is a necessary evil may have some justice in it, for it isn't really ornamental from the architect's point of view, and it brings in no visible income. For this reason the plant will probably find itself located in the most undesirable area in the building and with little reference to convenience of fuel handling or to the location of the chimney. These difficulties can be overcome by careful study, and if the total floor space available is sufficient and the height adequate, it is about all that can be hoped for—and possibly more.

The anticipated growth of patronage of a modern hotel generally makes it necessary to provide in the original design for future enlargement, either vertically or horizontally. This must be taken into account, not only in the boiler-room layout, but in the arrangement of the entire plant. The vacant spaces left for future boilers and future units of the generating and refrigerating equipment may have the appearance of a bad investment, but on the whole the total investment in this way will be substantially less than would be the cost of moving out some other department in the future to provide space for power plant extensions.

The type of the boilers and the character of fuel used will depend on the size of the project and the price at which fuel can be had. For large hotels, boilers of the water-tube pattern are generally used, especially where a generating plant is involved. Water-tube boilers can be more perfectly cleaned than boilers of any other type, and if the quantity of steam wasted through the exhaust head is considerable, involving a considerable amount of raw make-up water, this question of perfect cleaning is vital to the life of the plant. In cases where the boilers are used for only heating and cooking purposes, which involve very little make-up water, the deterioration of any type of boiler is not great, and under these conditions a tubular or fire-box type of boiler is considerably cheaper and about as efficient.



Plan of Power Plant, Hotel Statler, Buffalo, N. Y.

Equipped with pressure water-tube boilers. Electric service of 25 cycle from outside converted to direct current. Provisions made for future installation of turbo-generators  
J. F. Musselman, Engineer; Geo. B. Post & Sons, Architects

Where coal is used as fuel, its price and its character will determine the advisability and kind of stoker. A hotel in this respect is no different from any other building with the same load. Where the plant is small enough to be handled easily by one fireman, it is doubtful if stokers make an economical investment, unless having them permits use of a cheaper fuel than could be used otherwise. Even where this is the case, the same results can often be had with pinhole grates and a forced draught system.

Oil as a fuel is gaining in popularity of late, even in the east, which is closest to the mines and farthest from the wells. The difference in cost is not wholly responsible for this popularity, although there is little doubt but that a saving can be made by the use of oil in a high-pressure plant in an eastern city under the present comparative prices of coal and oil. But from the standpoint of convenience, fuel oil is even more attractive, for one of the greatest sources of annoyance in hotel work is the handling of coal and ashes.

In justice to the coal man it must be said that oil can be wasted by inefficient firing with much less effect than coal, for in order to waste coal it at least must be handled and fired, which is not true in the same degree with oil.

The reliability of deliveries of coal and oil is about equal, with the recent coal shortage working the balance in favor of the oil. Whether or not the



oil supply is in danger of exhaustion is something that can be guessed at, but cannot be determined. On this score, there is some satisfaction in the knowledge that if the world's oil supply is exhausted, as many geologists hold that it soon will be, there is no great trouble or expense involved in converting back to use of coal.

Economy of operation of a generating plant is based on the utilization of as nearly all of the available exhaust steam as possible. In winter this is simple, for the heating system needs it all the more, but the wasted heat of the wasted exhaust in summer is the thing that is so likely to make a generating plant a losing proposition, and the reason why generating plants in summer hotels are rarely advisable. Aside from the heating system, the exhaust steam will, of course, be used for heating water and in connection with some parts of the laundry and kitchen, but this does not account for all that is available, and brings up the point of the possibility of using exhaust steam in an absorption refrigerating plant. This possibility deserves more consideration than it ordinarily gets. It of course increases the pressure on the exhaust system, which reduces the efficiency of the generating plant, but the over-all efficiency of this arrangement with a generating plant is considerably higher than that of a compression plant, where a large part of the exhaust from both the generating engines and the compressors is wasted.

In order to hold down to a minimum the initial investment in plant, it is well to look into the possibility of using a breakdown electric service from an outside source. Such a service, where available, can be used to help out on unusual peaks. If the price is right for this breakdown energy and the maximum demand charges not too high, a plant can be designed on the simplest possible lines, that will give a truly wonderful efficiency. Such a plant needs no standby units, and the generating units or unit become simply makers of exhaust steam, so proportioned that the amount of exhaust steam available is just equal to the demand. An example of this arrangement is found in the Pennsylvania Hotel in New York, which has only one 500-kw. generating unit.

For hotel work engines of the Uni-flow pattern are well adapted. This type of engine has been considerably improved in design within the last few years. Its comparatively high efficiency at low loads has made the design popular, and it is being used now in fields which were served for many years by the Corliss engine alone. Steam turbines have been used to a certain extent in recent hotel work. They are low in first cost and occupy comparatively little space, but their efficiency under back-pressure conditions and at low loads has never been quite as good as that of a well proportioned reciprocating engine; and then the reliability of the steam turbine under these conditions has not been altogether satisfactory, and as yet their use is not frequent.

If the electric current is to be generated on the premises, it should be, by all means, direct current. There is no possible point in using an alternate current generating plant for this character of building, unless it be to conform to the characteristics of an outside service. The cost of generating and distributing direct and alternating current for the building is approximately the same, but direct current is somewhat better for motors which require speed variation, and very much better for elevator work. In fact, it is only within the last two years or so that high speed elevators of alternating current pattern have been worked up to a state even approximating perfection.

With current from an outside source, it is a case of take what you can get; but if this happens to be 25-cycle, alternating current, something has to be done about it. This low frequency gives a constant flicker in the lights which is noticeable, and in fact objectionable, to anyone who has not been educated down to it. If the frequency is 60-cycle, the character of the illumination and the wiring for lighting are the same as with direct current, and the lighting of the building can be thrown at pleasure from a direct current plant to an alternating service. In this case the converter equipment need be only large enough for the direct current motors, while with a 25-cycle service it will be called on to convert the total load of power and light.

The character of the dining room and restaurant business and the policy of its steward, rather than the size of the hotel, determine the capacity of the refrigerating plant. In the immediate vicinity of New York there are hotels operating very comfortably with 10-ton plants, while other hotels with the same number of rooms have 50-ton plants, struggling under the load. To strike a guess average of an uncertain variable, it might be said that a city hotel with a good restaurant business and with running drinking water in every bathroom will require about four tons of refrigerating capacity per hundred rooms. This will generally suffice to cool all kitchen and pantry boxes, to freeze the necessary ice, and to chill the drinking water. Of this amount about one ton of refrigerating per hundred rooms will go to the drinking water system and its piping, while one-half of a ton per hundred rooms will be consumed in the form of ice.

The figures given for the refrigeration required to cool the drinking water and supplying the amount of ice which the hotel will demand are startling when analyzed from a heat unit standpoint. They show that an average hotel occupant consumes during a maximum hour almost half a gallon of drinking water and a quarter of a pound of ice. This can be accounted for, however, by the radiation losses in the piping of the drinking water system and the fact that the greater portion of ice which is frozen never finds its way to the dining room. The luxurious rate at which the drinking water system consumes refrigeration should not condemn it in a



modern hotel, and the practice of furnishing chilled running water in every bathroom has become prevalent and will remain so. The importance of properly insulating the pipes of the drinking water system in order to reduce to a minimum this constant radiation loss can hardly be over-stated. These pipes generally run in warm pipe spaces, along with steam pipes and hot water pipes, and inasmuch as refrigeration is expensive to produce under any condition, the best possible covering of the ice-water pipes is none too good.

Another unnecessary waste in connection with the refrigerating apparatus that can be overcome at the outset is the practice of using cheap, thin-walled refrigerators.

The character of the refrigerating plant proper depends generally on the character of the power plant. If electricity happens to be cheap and fuel dear, a motor-driven compression system would be used, but if an ample quantity of exhaust steam is available at a sufficient pressure, an absorption system is more economical. Where the compression system is used, the refrigerant need not be ammonia, necessarily, and a great many recent hotels have used carbon dioxide plants. These carbon dioxide plants are not quite as efficient, theoretically, as ammonia plants of the same sizes, but the use of an inert and perfectly harmless gas has tremendous advantages in case of a rupture in a refrigerant line.

As an offset to this advantage the makers of ammonia machines bring up the point that the pressure required for the ammonia system is only a fraction of that necessary with carbon dioxide. This is obvious, but after all, when piping and condensers are being constructed for high pressure it is not very much more difficult to construct for a 950-

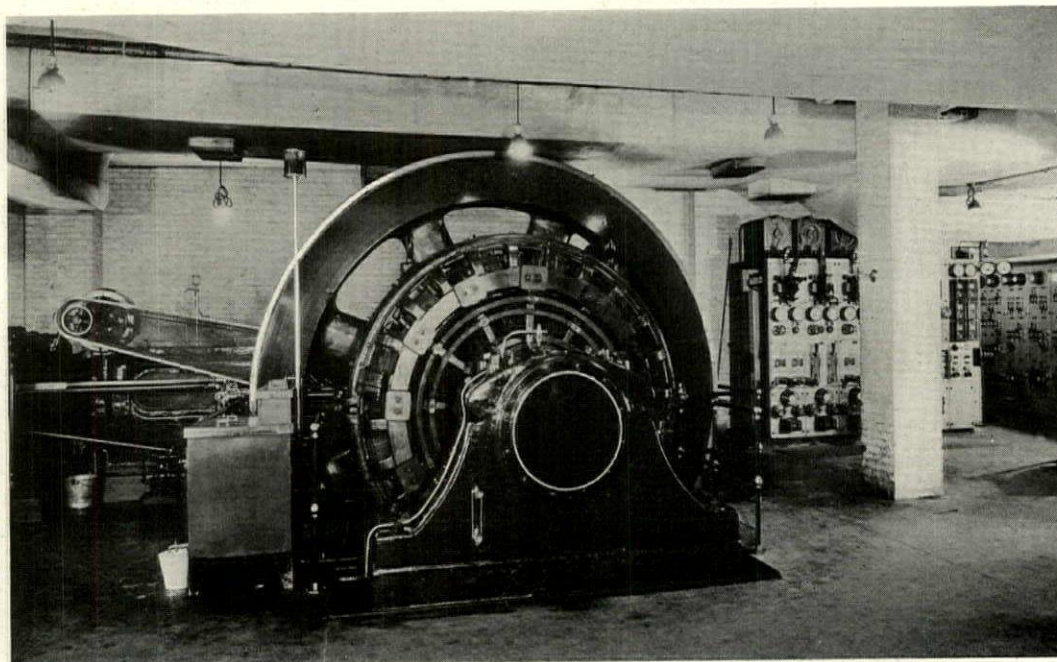
pound pressure than for say, perhaps, 180 pounds.

Until comparatively recently, it has been the practice to install only one refrigerating machine in each hotel. The occasional shutting down of this machine for repairs and overhauling is unavoidable, and when this occurs it involves inconvenience and loss that are not warranted by the saving in first cost. It is fully as important to provide a standby unit in the refrigerating plant as in the boiler or generating plant. This standby unit need not be of full capacity, for it is comparatively easy to curtail the refrigeration for a few days.

On account of the fact that the temperature required for making ice cream is considerably below the economical brine temperature for other parts of the refrigerating system, it is generally advisable in a large hotel to provide a separate small refrigerating unit, used only to freeze and harden the ice cream. The first cost of such a unit is considerable, but from an operating standpoint it puts the main refrigerating plant on a much more economical basis.

The cost of power is not the only large item in the operation of a refrigerating plant. The water used in the condensers, if wasted, is costly and sometimes exceeds the water consumption of all other parts of the hotel. The condensers warm this water very slightly, and there is no objection to using it for domestic purposes, after it has passed through the condensers. The rate of flow through the condensers is very constant and, in order to use this water, a large cistern or tank must be provided to take care of the variable rate of consumption in the domestic system.

The capacity of this surge tank can be determined only by plotting the curve of domestic demand against a curve of condenser water.



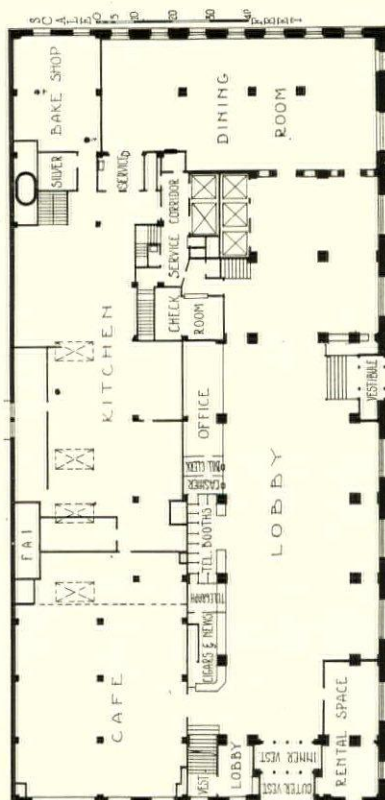
Engine Room, Pennsylvania Hotel, New York, Showing Dynamo and Main Switchboard

McKim, Mead & White, Architects

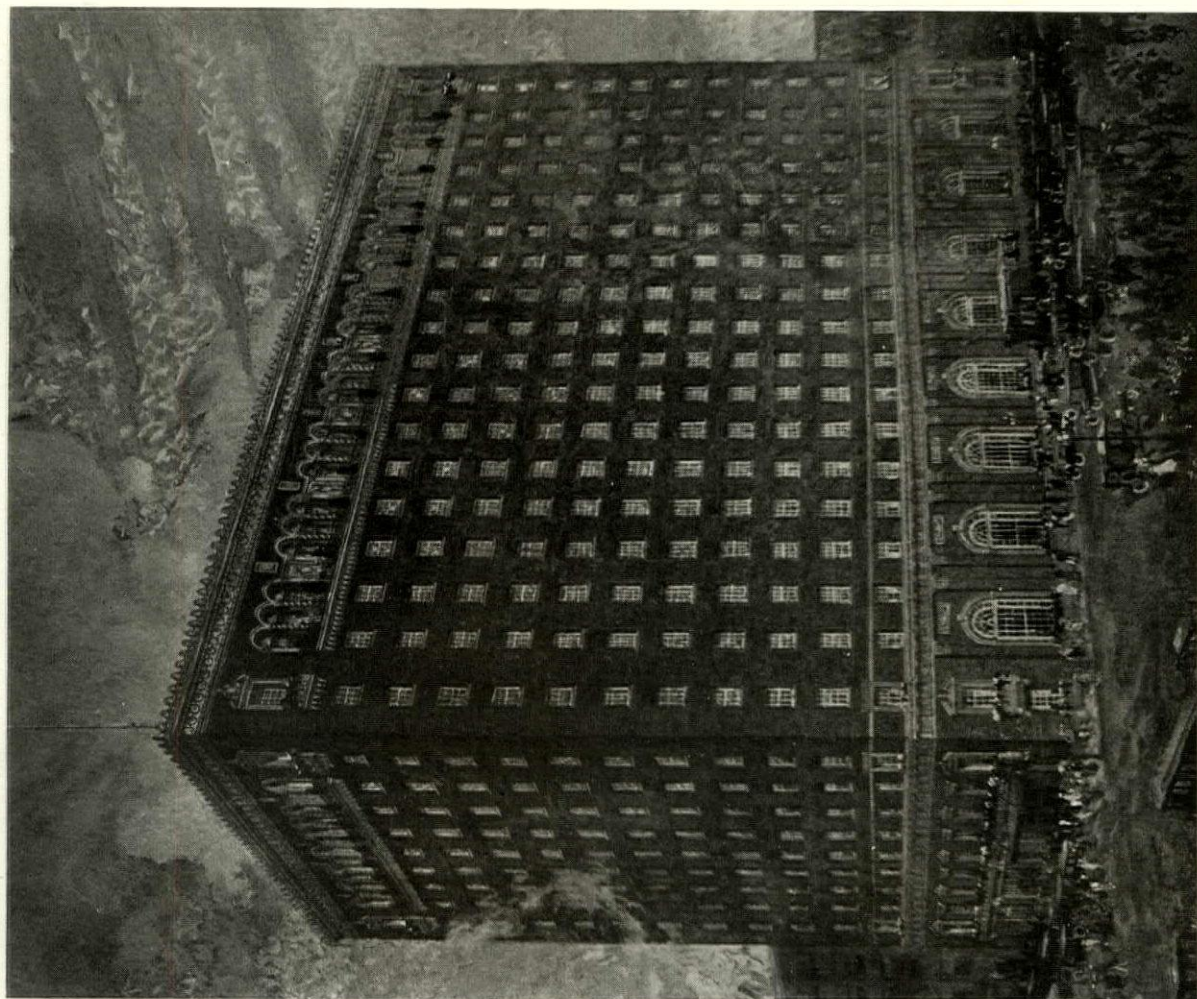




INTERIOR OF LOBBY



FIRST FLOOR PLAN



GENERAL VIEW OF EXTERIOR

HOTEL TEXAS, FORT WORTH, TEXAS  
SANGUINET & STAATS AND MAURAN, RUSSELL & CROWELL, ASSOCIATE ARCHITECTS

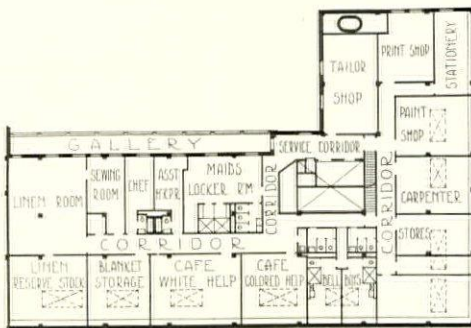


## HOTEL TEXAS, FORT WORTH

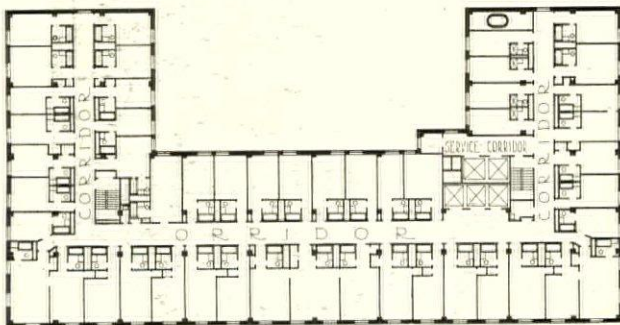
Illustrations on Plate 91

This hotel has 438 guest rooms, each with private bath, and two floors are given over to sample rooms and a number of special suites. The dining facilities include a main dining room seating 100, a cafe on the street frontage, and three private dining rooms on the mezzanine equipped with a service pantry.

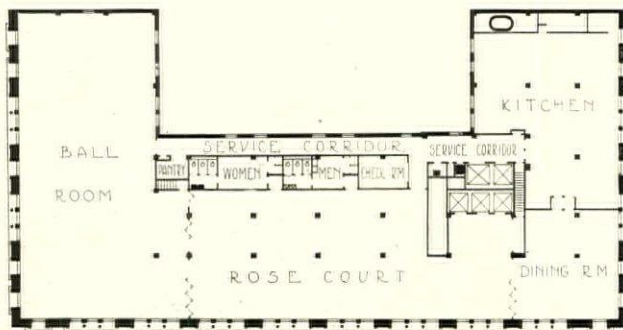
The ball room, 4,259 square feet in area, is on the 14th floor, grouped with two dining rooms, all of which can be thrown together, accommodating 3,000 people. This group is served by a complete kitchen. The 15th floor is given over to service and employees' quarters. The total floor area of the building is 271,514 square feet; its contents is 3,165,000 cubic feet, and it cost, including architects' fees, laundry and other equipment, but exclusive of furnishings, \$2,566,000.



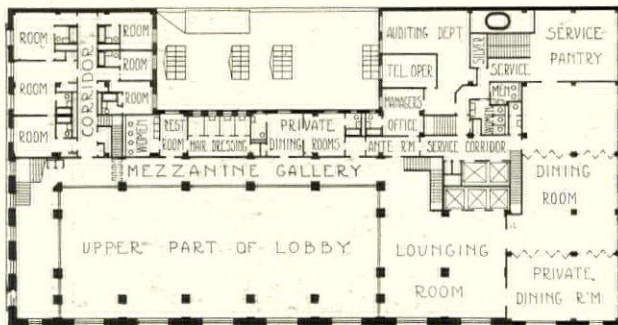
SERVICE, FIFTEENTH FLOOR PLAN



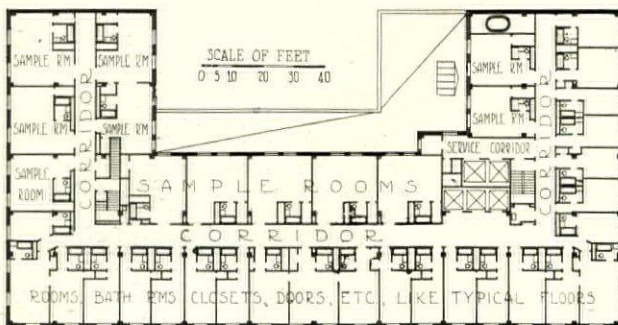
TYPICAL (6-12) FLOOR PLAN



BALL ROOM, FOURTEENTH FLOOR PLAN



MEZZANINE FLOOR PLAN

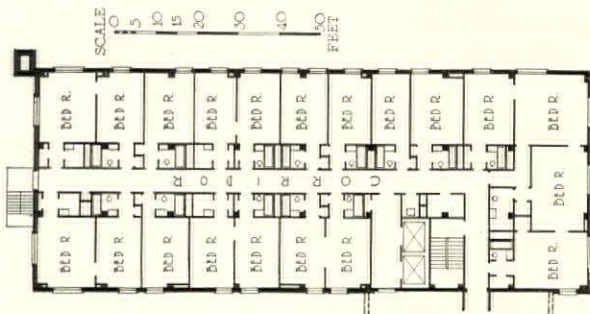


SAMPLE ROOM, THIRD FLOOR PLAN

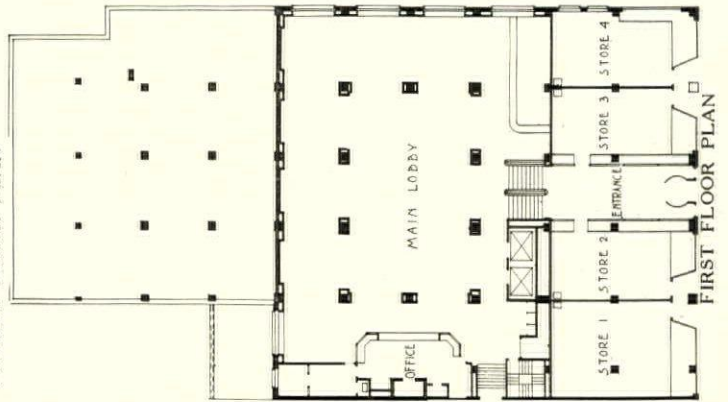


This is the first wing of a three-wing building. The old hotel remains at the left, and contains the coffee room and kitchen; the dining room and new kitchen will be provided in future construction. The present wing contains 135 guest rooms and baths, and the total capacity will be 400. The construction is fireproof, of reinforced concrete with hollow tile and stucco exterior walls. Marble and tile floors with faience tile wainscoting are used in the public rooms. Heating is by low-pressure steam system from crude oil fuel; fresh air is supplied to lobby; stationary vacuum cleaning plant is installed.

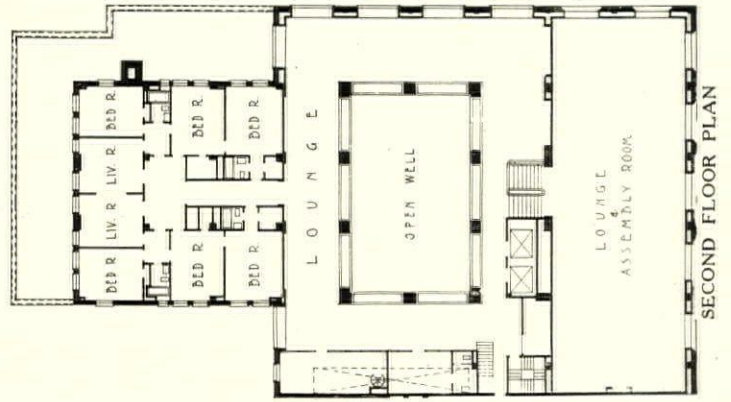
Total contents 900,000 cubic feet; approximate cost of building, exclusive of furnishing and professional fees, \$450,000, or 50 cents per cubic foot. Date of general contract, February 1, 1922; date of completion, January, 1923.



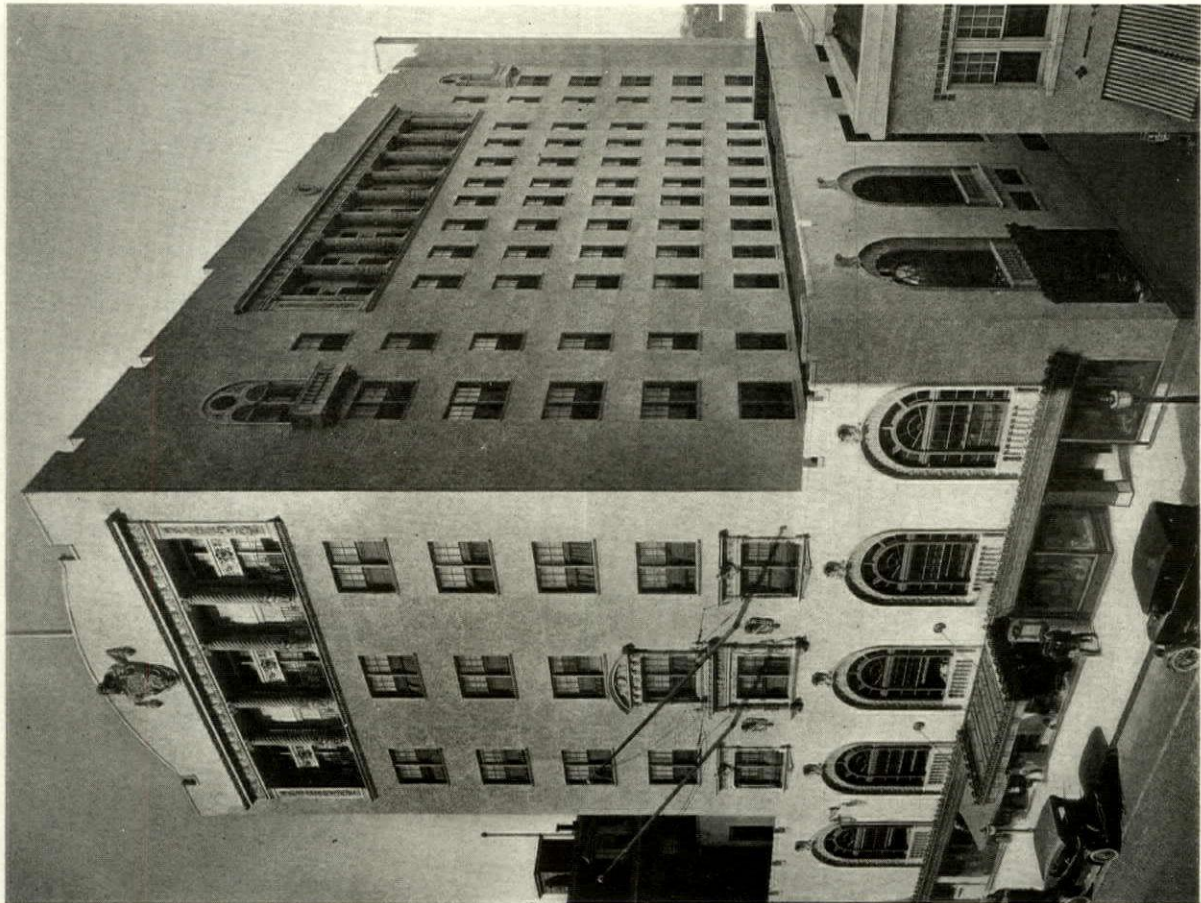
TYPICAL FLOOR PLAN



FIRST FLOOR PLAN



SECOND FLOOR PLAN

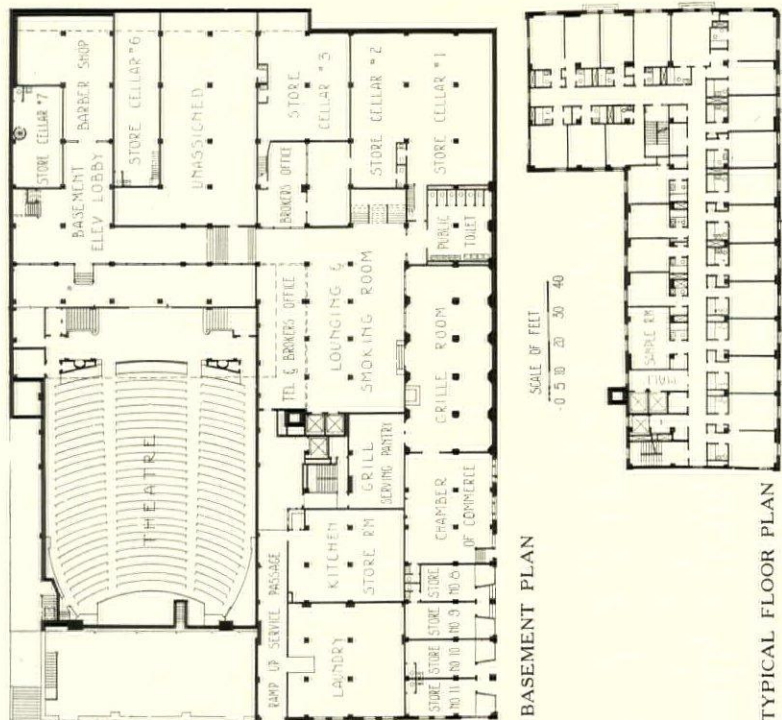


GENERAL EXTERIOR VIEW  
SAN JUAN HOTEL, ORLANDO, FLA.  
W. L. STODDART, ARCHITECT

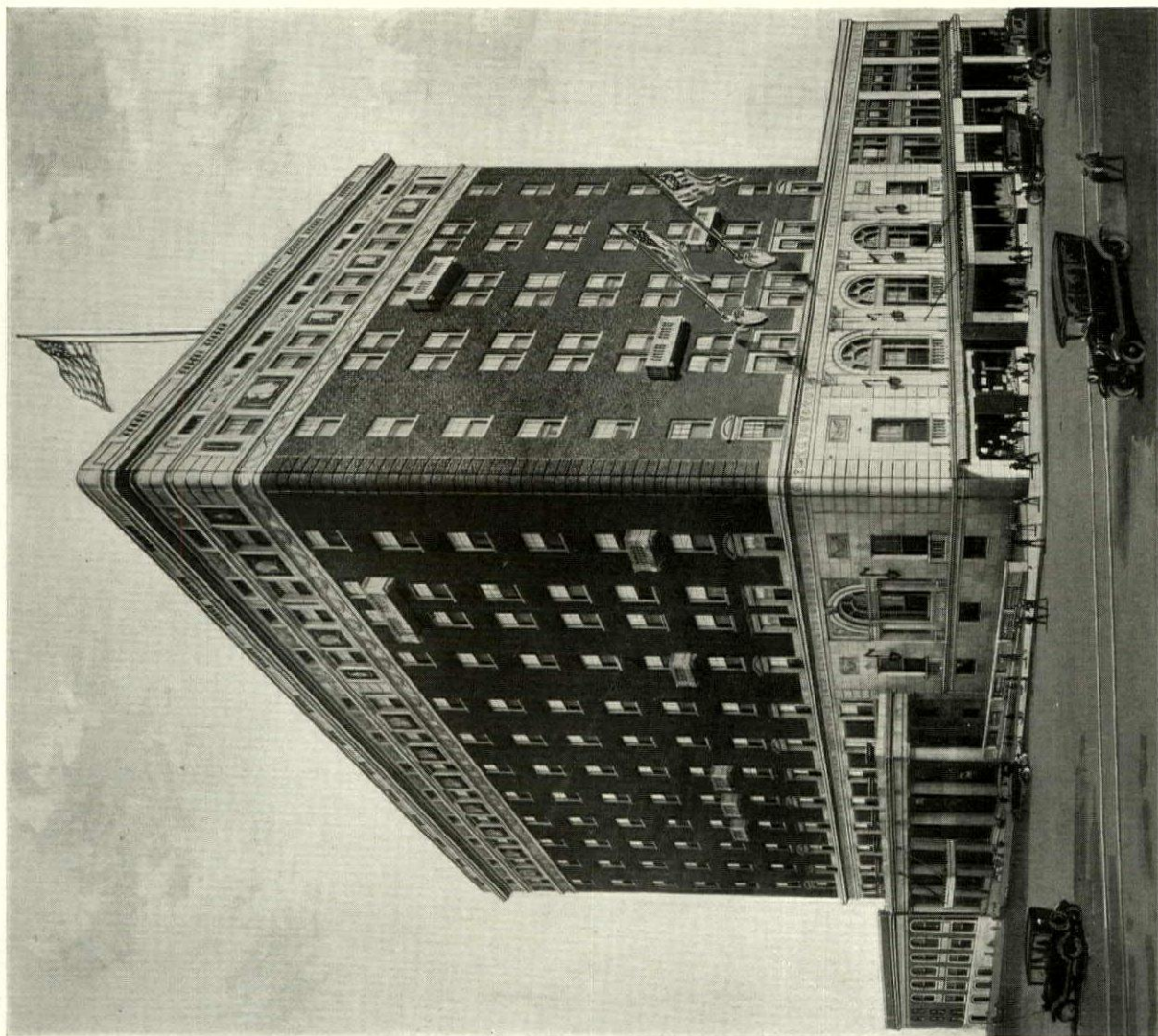








This hotel contains 220 guest rooms and baths; future provision will add 200 rooms and baths. The dining room seats 200 people, the coffee room 100, and the grill room 150. These rooms and the ballroom, which accommodates 400 people, are served by one kitchen. The construction is fireproof, of reinforced concrete and steel; the exterior materials are red brick and terra cotta. Heating is by low-pressure vacuum steam from coal fuel; power furnished from central station. Mechanical equipment includes laundry; ventilating system, air washing, refrigeration, vacuum cleaning, and water-softening. Contents, 1,846,000 cubic feet; approximate cost, \$1,070,000 or 58 cents per cubic foot. The building was completed in December, 1922.



GEORGE WASHINGTON HOTEL, WASHINGTON, PA.  
W. L. STODDART, ARCHITECT









PERSPECTIVE STUDY OF STREET FACADES



PERSPECTIVE OF COURT SIDE  
ATLANTA-BILTMORE HOTEL, ATLANTA  
SCHULTZE & WEAVER, ARCHITECTS

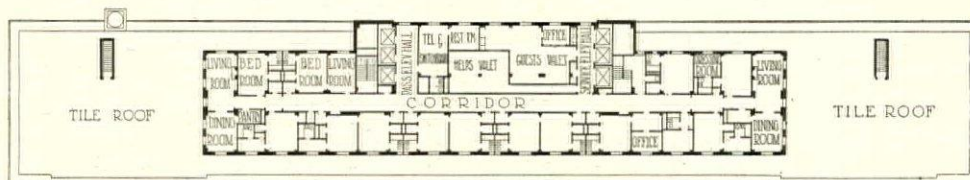


# ATLANTA-BILTMORE HOTEL, ATLANTA

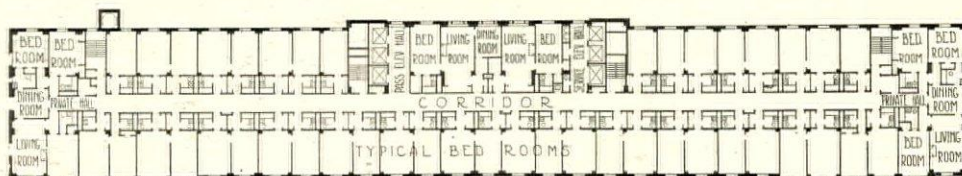
Illustrations on Plate 94

This hotel is at present under construction; it is built in the shape of a large U, with the court away from the street; the wings are devoted to apartments supplied with hotel service; the hotel proper is confined to the main street frontage. The building contains 539 guest rooms and 477 baths; the total dining room capacity is 1096, the rooms served by 2 kitchens and 3 pantries. A ball room accommodates

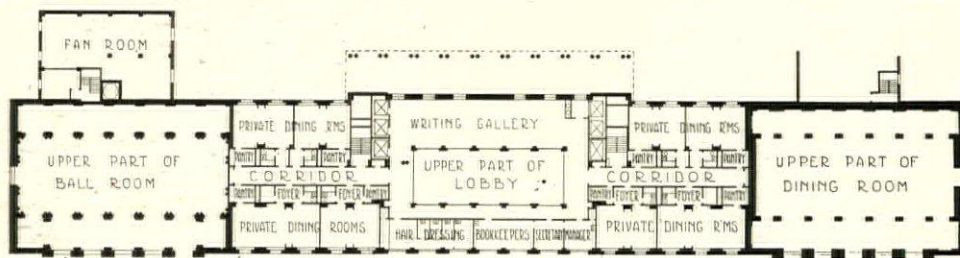
475 people. The construction is fire-proof, with reinforced concrete frame and floors. Power is secured from central station service; heating is two-pipe steam system from coal fuel; mechanical equipment includes ventilation for public rooms and spaces below street, air washing for the public rooms, 60-ton refrigerating plant, and two-unit, eight-sweeper capacity vacuum cleaning plant.



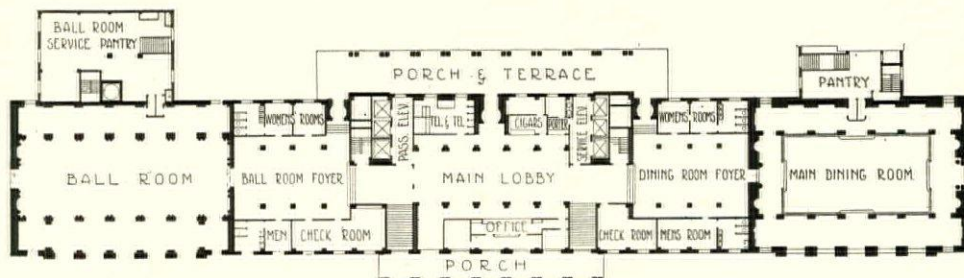
TENTH FLOOR PLAN



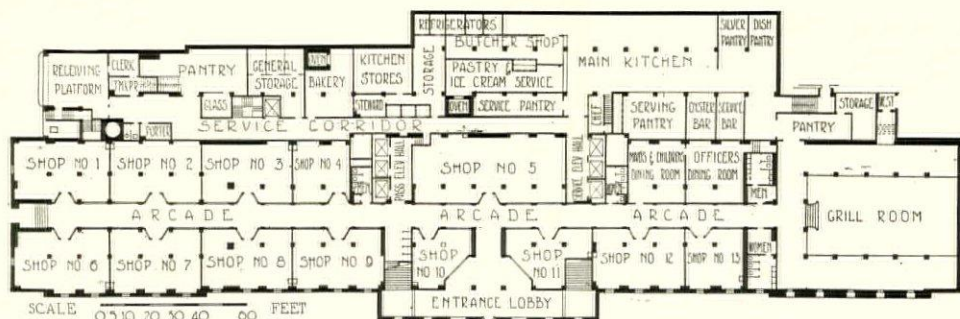
TYPICAL FLOOR PLAN



MEZZANINE FLOOR PLAN



FIRST FLOOR PLAN



GROUND FLOOR PLAN

SCALE 0 5 10 20 30 40 50 FEET

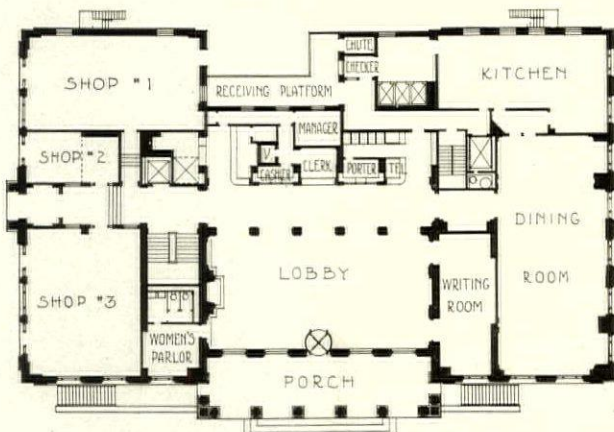




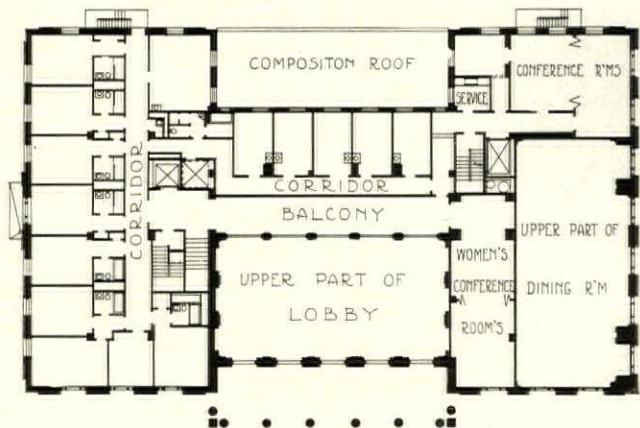
GENERAL EXTERIOR VIEW

This building is arranged to serve local community and social needs as well as to provide accommodations to the traveler. It contains 80 guest rooms, the majority of which are supplied with private baths; the smaller rooms at the front and rear of the main block are equipped only with lavatories, and general toilets are arranged to serve them. A large lobby and dining

room, finished in Georgian wood paneling to accord with the exterior, and the ball room on the fourth floor comprise the public portions aside from three conference rooms on the mezzanine. The ball room is served from the main kitchen by elevator. Three shops are incorporated on the ground floor below the guest rooms on the mezzanine floor.



FIRST FLOOR PLAN



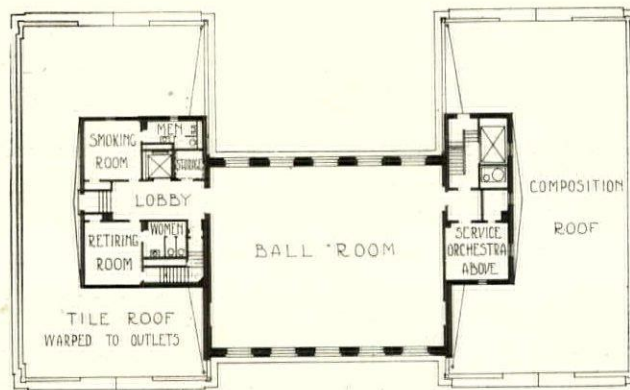
SECOND FLOOR PLAN

NEW CAPITAL HOTEL, FRANKFORT, KY.

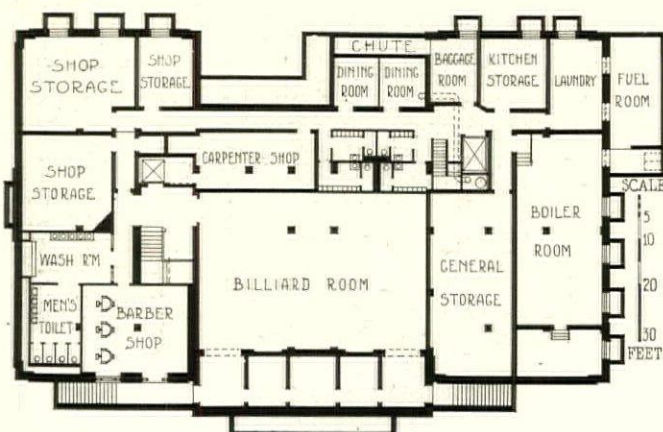
FRANK L. PACKARD AND LEO L. OBERWARTH, ASSOCIATED ARCHITECTS



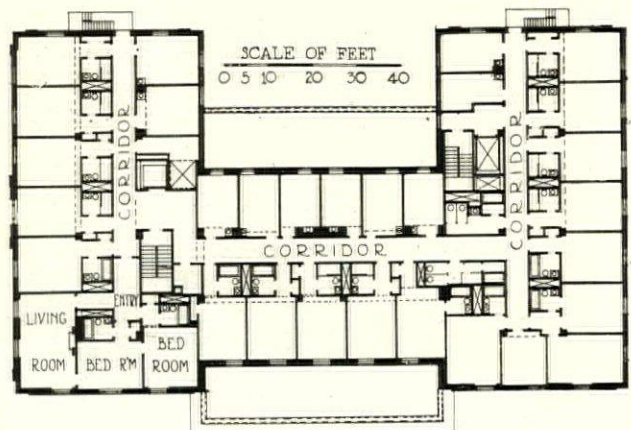
NEW CAPITAL HOTEL  
FRANKFORT, KY.  
Illustrations on Plate 95



BALL ROOM FLOOR PLAN

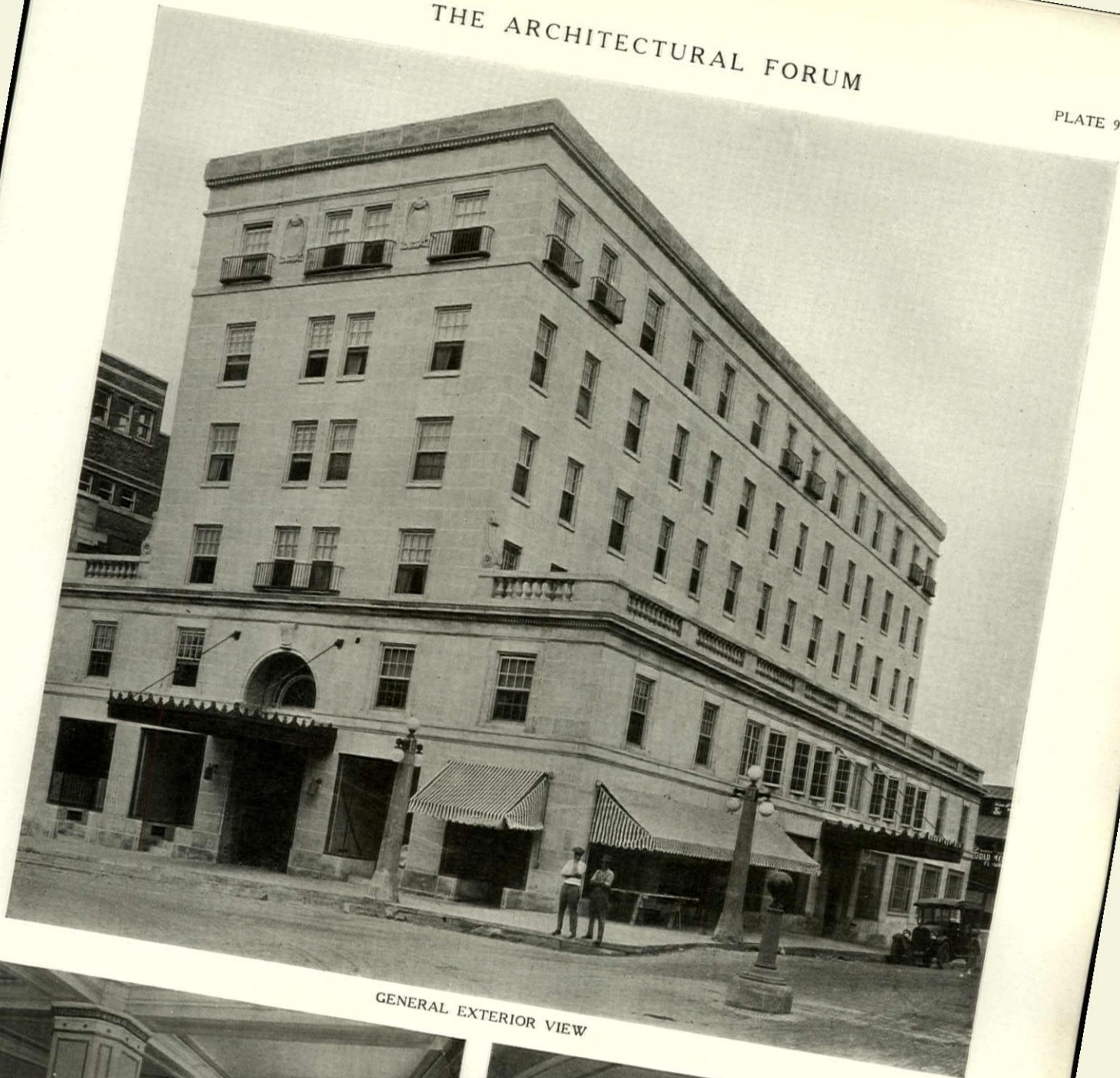


BASEMENT FLOOR PLAN



TYPICAL FLOOR PLAN





GENERAL EXTERIOR VIEW



DINING ROOM



BANQUET ROOM

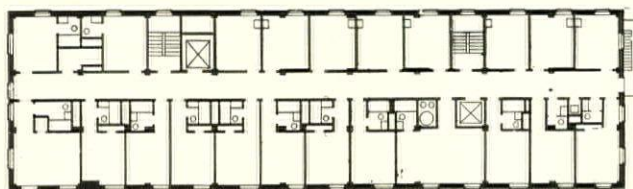
GREYSTONE HOTEL, BEDFORD, IND.  
NICOL, SCHOLER & HOFFMAN, ARCHITECTS



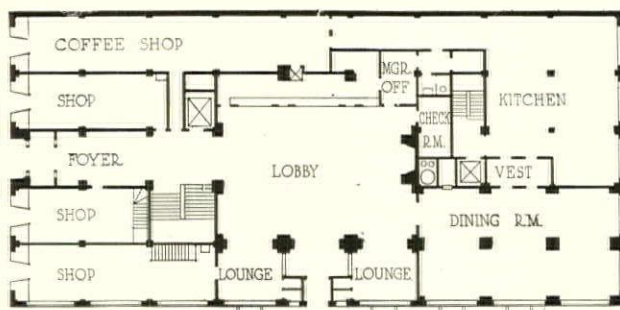
# HOTEL GREYSTONE, BEDFORD, IND.

Illustrations on Plate 96

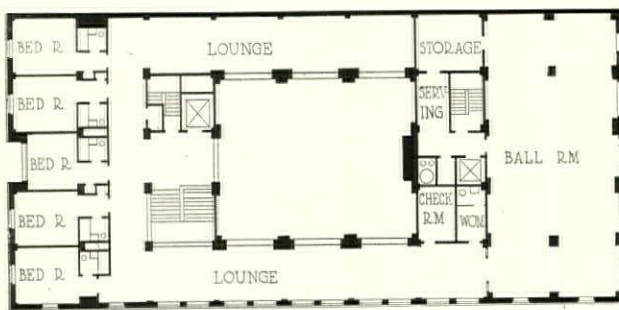
This hotel represents a modern solution of the typical commercial hotel problem in the smaller city. It contains 87 guest rooms, inclusive of four sample rooms, one on each typical floor adjoining the freight elevator; 35 guest rooms are supplied with lavatory only and general toilet facilities, but no baths are supplied for men and women on each floor. The public portion comprises the main lobby with mezzanine gallery, lounge and dining room. A banquet or ball room, 30 x 61, is directly over the kitchen and connected with it by elevator and stairs. The street frontage is occupied by four shops, one of which is fitted up as a coffee room with service from the kitchen.



TYPICAL FLOOR PLAN



FIRST FLOOR PLAN



MEZZANINE FLOOR PLAN



# Hotel Heating and Ventilating

By ARTHUR K. OHMES

*of Tenney & Ohmes, Consulting Engineers on Mechanical Equipment of Buildings, New York*

THE question of having a suitable heating and ventilating equipment in a hotel deserves the most serious consideration of the prospective hotel owner or operator. If we regard as indispensable such modern conveniences as sanitation, refrigeration, water supply and electric light, we must admit that there are perhaps more joy and comfort to be had from a good heating and ventilating system than from any other item on the list. Sanitation and water supply rank together with suitable temperature conditions in importance to health, but real bodily comfort goes most of all with heat in the cold, dreary winter, and with coolness in the hot summer weather. Another factor must be considered, and it is that a good heating and ventilating equipment increases the efficiency of the worker and is one of the most important factors in making the guest satisfied.

The present conditions of unrest of the workers and the ever-increasing demands of the workers and of health departments, will all be conducive to making this provision of bodily comfort more and more compulsory. If not given by hotel owners, on their own account without outside force, such force will be supplied in the form of laws, regulations, etc.

The heating question is not difficult to solve for the reason that it is quite simple to oversupply a room with heat, because space conditions make it an easy possibility in most cases. Nor is an excessive installation expense incurred in doing so. Such practice, however, must be seriously condemned for the reason that the already high operating expenses with the present high cost of steam and coal, are greatly increased. Furthermore, unduly large radiators make it difficult to secure a healthful temperature for three-quarters of the heating season. After all, the maximum demand of a heating apparatus must be met only during a few days in the year, and on these few days good judgment demands that, if an error must be made, it had better be made on the side of a slight "underheating" instead of "overheating" of the room. This holds particularly true of the "transient" type of hotel.

Now consider the ventilating problem (which we may as well admit means that temperature conditions must be maintained within reason) of the modern hotel in our large cities with its underground spaces, many of which contain tremendous heat generators, the most common being the equipment of the engine- and boiler-rooms, kitchens, laundries, bakeries, garbage incinerators, etc. Where is there a large hotel in our cities which can claim that the ventilation in the warm summer

weather has been solved at all times to the entire satisfaction of the help employed in these rooms?

When on these days humanity is decidedly uncomfortable (not to say wilting away) in its homes, or in parks, on mountains and lakes and at ocean resorts, what comfort can there be for the ordinary hotel worker? Is there a hotel operator who has not been annoyed by complaints and by sickness on account of heat in the hot and sultry summer weather? Indeed, where is the hotel manager who has not felt on these days of unrest that the ventilating question is the most difficult and nerve-racking question to be solved to the satisfaction of the help? The efficiency of the ventilating engineer, using constants which have proved fairly satisfactory in other installations, is then questioned, despite the fact that frequently building conditions such as low headroom and insufficient space, or badly insulated ovens, kettles, ranges, steam presses, drying rooms, steam pipes and steam cylinders, make his already difficult problems practically impossible of solution.

The ventilating engineer has the means at his disposal of creating the best atmospheric conditions by cooling which would satisfy all hotel workers, but where is there a hotel which could afford to be burdened with the tremendous first cost and the consequent high maintenance and operating costs of artificial cooling?

## The Heating System

When deciding upon the heating system careful consideration should be given to the climatic conditions, the peculiarities of the average guest, and the installation difficulties. Every country has its own demands in the matter of heating, and it appears correct to say that the requirements of the average American guest are quite different from those of other countries. A guest will use his room during the day for various purposes, for frequently it will serve him in the morning for a breakfast room, then living room, and at night as bedroom. For 90 per cent of the guests, this means a warm room in the day and a cold room at night. A guest room in our hotels where such conditions cannot be quickly created by the heating apparatus would be considered as improperly heated. It is natural that a steam heating system is most suitable, for it gives a quicker heating-up effect when heat is turned on, and the heat effect of a warm radiator is quickly lost when steam is turned off at night.

Besides, in our northern climate the steam radiator does not readily "freeze up" when heat is partly turned on or when entirely turned off as



would be the case with a hot water radiator. Hotels have been heated with hot water in a few instances in our northern states, but frequent freeze-ups occurred, and the tremendous pressures existing in the pipe systems of high buildings make it scarcely a practical heating system. Although the writer is one of the firmest believers in hot water heating for private houses and institutions, he is firmly convinced that only hotels in our southern states (if not too high) should be considered as suitable for hot water heating. Thus, for instance, in a low hotel in Florida, where outside temperature rarely goes below the freezing point, and where heat is only required in the early morning and late evening hours, a hot water heating system would give the best results. It is fully realized that hot water heating is the most healthful heat, its supplying of heat is absolutely noiseless, and it is practically indestructible.

Heating by means of air warmed over steam coils at a central point has been in successful operation in a prominent large New York hotel for some 20 years, but its high installation expense and the considerable space required for ducts and flues usually prohibit its consideration for all localities except possibly for earthquake zones.

We may perhaps look forward to using gas or electric heat for mild days in connection with steam heat for cold days, due to the ever-changing economic conditions and the new inventions made, but for many years no serious consideration need be given unless prices of coal

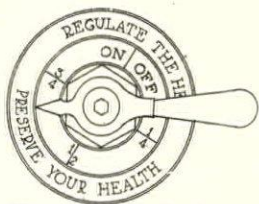


Fig. 1. A good scheme for valve dial top

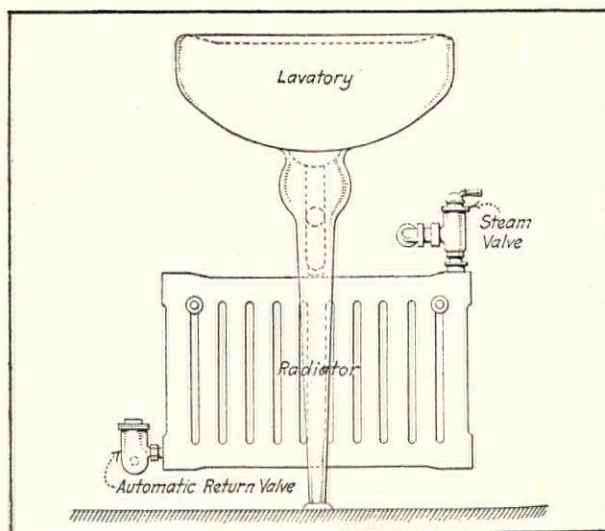


Fig. 3. Detail of interior bath room radiator and recommended position

and oil keep on mounting and the cost of electricity is reduced, due to the development of hydro-electric plants or central stations at the mines. On the other hand, there are said to be now quite a number of hotels in the mountainous regions in Europe where electric heat is used in rooms, or where steam or hot water is generated by electricity instead of by coal or oil. In these regions hydro-electric power is cheap, but coal very expensive, if it can be secured at all.

### Steam Heating System

The most suitable steam heating system for a hotel is a two-pipe system with return lines open to the atmosphere or with return lines kept under a vacuum of 5 to 10 inches by means of vacuum pumps. Either system allows the regulation of steam fed into radiators, and with it a heat regulation. Thus, for instance, by opening the valve slightly only a small amount of steam is fed into the radiator and with it a slight amount of heat is given out by the radiator. Recently a large hotel was completed where the dial top of the valve was finished as in Fig. 1, the purpose of which is self-evident.

All larger hotel steam heating systems should have vacuum pumps of large capacities to maintain a high vacuum. It will then, with a well designed pipe system, be

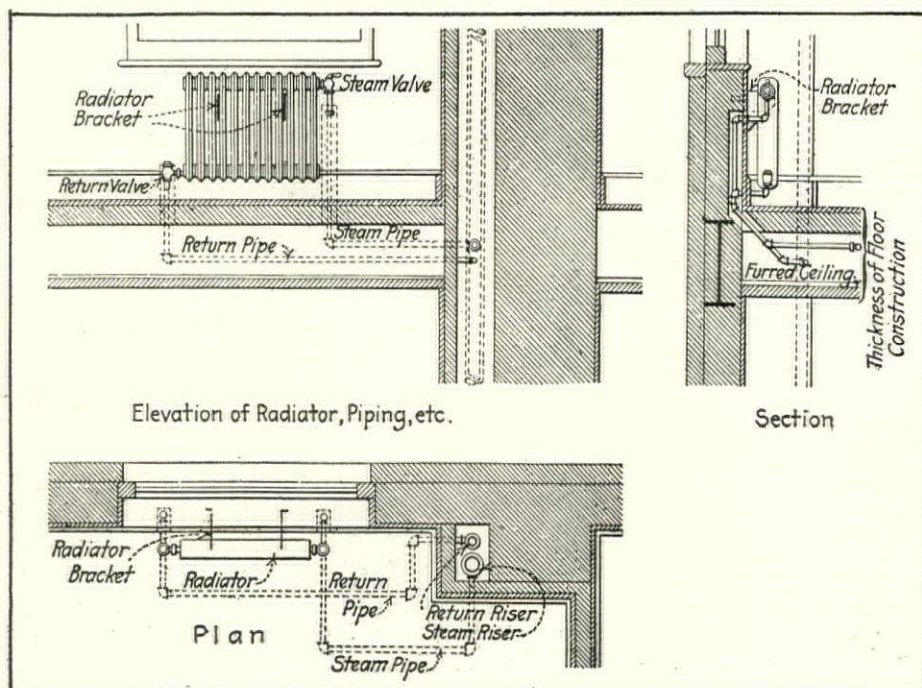


Fig. 2. Typical arrangement of radiators in guest rooms showing piping connections and entire clearance of finished floor



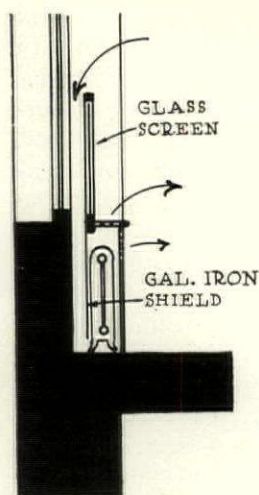


Fig. 4. Simple down draft prevention scheme

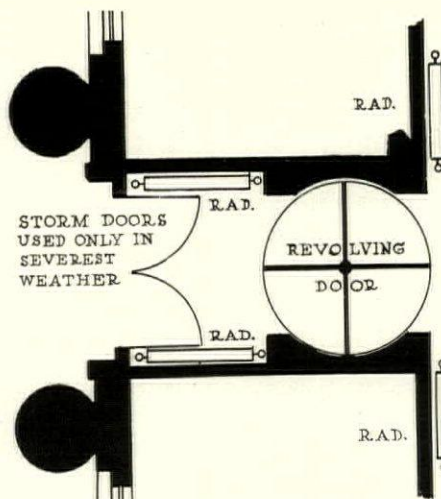


Fig. 5. Radiator and vestibule arrangement with revolving doors

possible to carry steam at less than atmospheric pressure in warmer weather, steam at atmospheric pressure in medium weather, and steam well above atmospheric pressure in cold weather. Such a method of operation is usually conducive to economy of steam consumption.

#### Heating System Details

Since all guest rooms are carpeted, due consideration should be given to making laying, removal or cleaning of carpets an easy possibility. A method where this has been completely accomplished is shown in Fig. 2. All bathrooms, even inside bathrooms in our northern states, should be heated, though in our southern states inside bathrooms need not be heated. A simple method is indicated in Fig. 3.

The present conventional arrangement of a guest room and its bath leads usually to the discussion of the most suitable place for the radiator. To illustrate, we shall consider Figs. 6 and 7 showing room arrangements with furniture. For the sake of convenience, we will consider them point by point:

##### *Radiators in Rear of Rooms (Fig. 6)*

###### Advantages

1. Ready access to piping for repairs, because piping is in accessible shaft.
2. Cheaper installation, because only one set of risers is required.

###### Disadvantages

1. Heat near head; frequent cause of headaches.
2. The ever-present slight noise from steam entering radiator; very objectionable to light sleepers.
3. Discolors walls.
4. Interferes with furniture arrangement.

##### *Radiators Under Windows (Fig. 7)*

###### Advantages

1. Prevents down draft from windows.
2. Makes it possible to sit in cold weather before window with comfort.
3. No interference with furniture arrangement.
4. Only washable curtains are discolored.

###### Disadvantages

1. Increased cost of installation, because two sets of risers are required.
2. Difficult of access for repairs, because one set of risers is in furred wall. Objection may be overcome by not furring-in riser.

In heating the main rooms due consideration should be given to table arrangements, and to possible chilling effects from large windows due to down draft. A down draft prevention scheme is shown in Fig. 4.

Main entrance doors should be of the revolving type, and where these are exceptionally exposed, vestibules should be provided in addition as shown in Fig. 5. This provision is of most importance in high buildings in our northern states.

Radiators should be kept some 2 or 3 inches from the walls so as to make it possible to clean the backs of radiators, which should be done especially before the heating season begins so as to prevent the odor from burning dust.

The final decision is usually governed by financial considerations, the class of hotel erected, and the individual whims of the hotel operator.

Automatic temperature regulation installed many years ago so frequently in hotels has been mostly discarded in newer hotels. This is mainly due to better heating systems and to the fact that the average hotel guest was not familiar with the operation of the thermostat itself. It is natural that operating conditions suffered when such delicate instruments as thermostats were being "fixed" by men who in most cases had never seen them or at best "ran across" them but a few times a year.

In view of the general remarks made on the ventilation of hotels, it seems desirable to illustrate by a concrete example the essential differences exist-

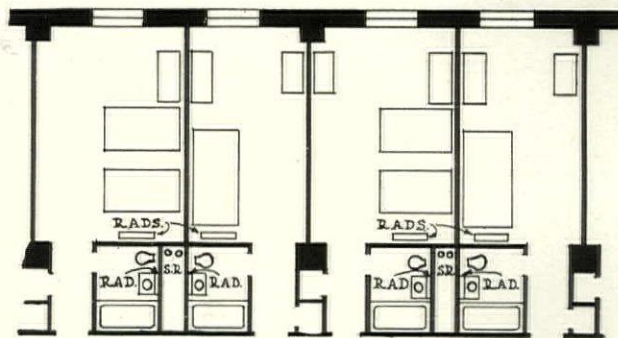


Fig. 6. Typical inside bath room guest units with radiators against rear wall

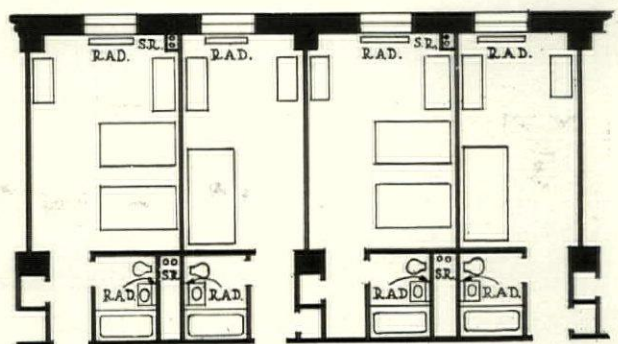


Fig. 7. Typical inside bath room guest units with radiators under windows



ing between hotel ventilation and that of other buildings, even where of a more or less similar class.

### Ventilating Requirements

The writer designed lately the ventilation for two kitchens serving on the average about the same number of people; the difference is that one serves a hotel and the other a hospital. As a rule, less service will be required and less costly meals will be prepared in a hospital (particularly as in this case it is a public hospital) than in a high class hotel. This statement may seem peculiar in view of the fact that sick people should be better taken care of than healthy people. The average "house count" in both is about the same, for the hospital is for about 2,000 beds or 2,000 people, the hotel for 1,500 rooms or about 2,000 people. Naturally, the hospital has no ball room and private dining room service, such as the hotel has, which frequently tax the kitchen tremendously. If we consider the dining room service to outsiders in a hotel, we must come to the conclusion that very much more work must be done in the hotel kitchen than in the hospital kitchen.

Now then as to the space conditions provided for doing the work: The hospital kitchen is 50 feet wide, 100 feet long, and 23 feet high. Ground area 5,000 square feet, cubic contents 115,000 cubic feet. The hotel kitchen is 44 feet wide, 44 feet long, and 9 feet high. Ground area 1,931 square feet, cubic contents 17,424 cubic feet. In other words, the hotel kitchen has 38.7 per cent of the

area of the hospital kitchen, and only 15.3 per cent of the cubic contents of the hospital kitchen. In addition to this the hospital kitchen has large windows, whereas the hotel kitchen is entirely underground, without any outside exposure whatsoever. It is just this condition which makes the hotel ventilating problem so difficult for the ventilating engineer. Similar conditions exist in all other departments, such as laundry, garbage disposal room, bakery, engine- and boiler-rooms.

The problem of a ventilating system in a hotel is ordinarily one of heat removal in the case of engine- and boiler-rooms, kitchen, laundry, bakeries, etc., or smoke removal in ball, banquet or private dining rooms, or odor removal in a bathroom, toilet or locker room. The question of stuffy air scarcely ever enters, nor the chemical composition of the air; if heat, smoke and odors are removed to the satisfaction of either the hotel, guest or smoker, the "ventilation" is good.

To illustrate the different requirements of the ventilating system on a 90° day compared to say a zero day, we may compare our own living rooms ventilated by windows. On a 90° day every window and door is wide open, whereas on a zero day everything is almost tightly shut. Still, we breathe as much air and consequently contaminate the air inside equally as much on each day. Yet we feel more comfortable on a zero day with worse air in a room than on a hot day.

Artificial ventilation in an underground room, giving at the best a proportion of 2:1 between minimum and maximum, is now supposed to give as much satisfaction as a room with several windows. The writer has often contended that the ventilation of really important underground spaces, such as kitchens and laundries, should have two ventilating systems to proportion about 70 per cent and 30 per cent of maximum capacity, both systems to run in warmest weather, the 70 per cent system in spring and fall, and the 30 per cent in cold weather. With proper motor control air proportions of 6:1 could be secured. Such treatment would also give a reserve system for the most important departments, but the increased costs and space condi-



Kitchen of Los Angeles-Biltmore Hotel, Los Angeles, showing swivel exhausts outside range hood

Schultze & Weaver, Architects; Clyde R. Place, Engineer



tions make this scheme usually prohibitive.

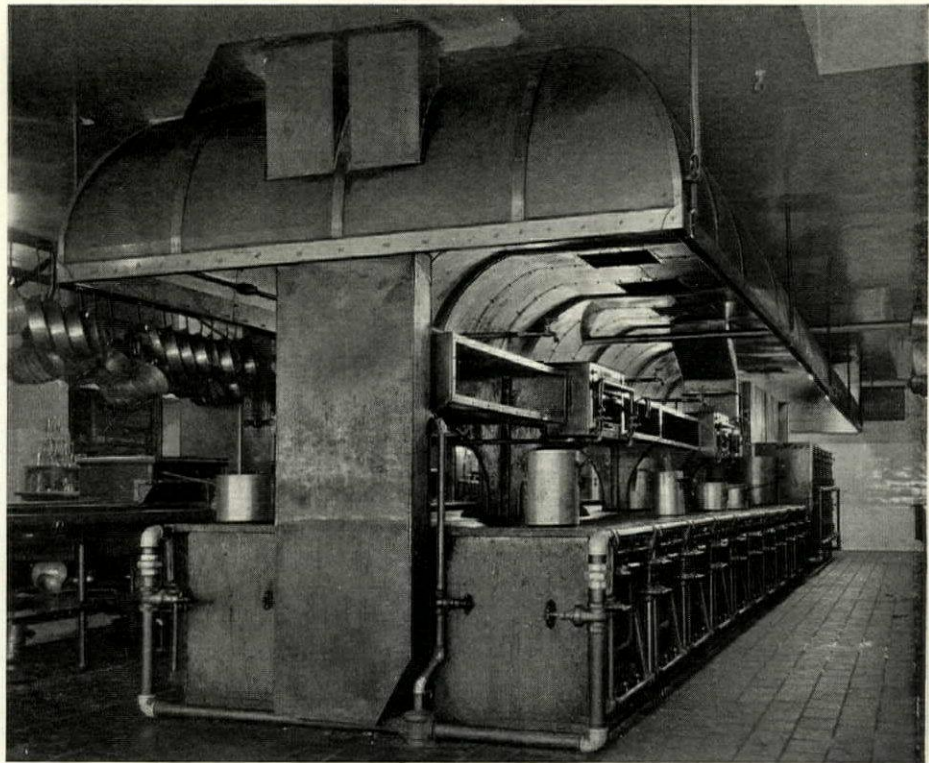
As to the maximum quantities to be allowed, we have had rooms better ventilated by ten changes an hour than others with 30 changes an hour. This is due to crowded conditions, low headroom, uncovered heat sources, etc. To give, therefore, rules for air changes without taking these factors into account would be both erroneous and confusing.

For the arrangement of flues and registers, it is well to follow as far as possible the laws of nature where working and architectural conditions permit them to be followed. All heat generated should be removed where generated. Hoods and curtains are essential to confine the heat so as not to allow it to come into the working spaces. Top exhaust is desirable for smoke removal, and the reversible system as described in THE FORUM for June, 1923, is particularly well adapted for ball rooms, etc.

In locating the various fans consideration must be given to noise transmission prevention. Machinery cork insulation should be applied, but it is far better not to rely to any great extent on this and to locate the fans and motors only above rooms where a slight noise and vibration can be tolerated. As to cleaning air, many good means such as various air washers or air filters are available, but it is best to locate the fresh air inlet in a clean place where really fresh air is to be secured.

As to the space conditions for ventilating equipment, notable progress has been made in the latter years. The tendency has been toward smaller and more efficient fans. In connection with this more and more attention is being paid by ventilating engineers to avoiding offsets and bends in ducts and flues. This has resulted in allowing higher air velocities. Years ago 24 feet per second in main flues was considered high, whereas now 35 feet per second is frequently allowed.

At present the entire program of building a hotel is contradictory, in that the heating appliances as usually installed are good for 20 to 30 years, the ventilating equipment for from 10 to 100 years, and the building itself for from 50 to 100 years. During the life of the building, according to the apparatus designed, it must be expected to make



Center grouping of ranges in kitchen of Pennsylvania Hotel, New York, showing large exhaust hoods

McKim, Mead & White, Architects; Tenney & Ohmes, Engineers

occasional replacements at a tremendous expense.

To estimate the average life of the integral parts forming the heating and ventilating equipment, this list is presented:

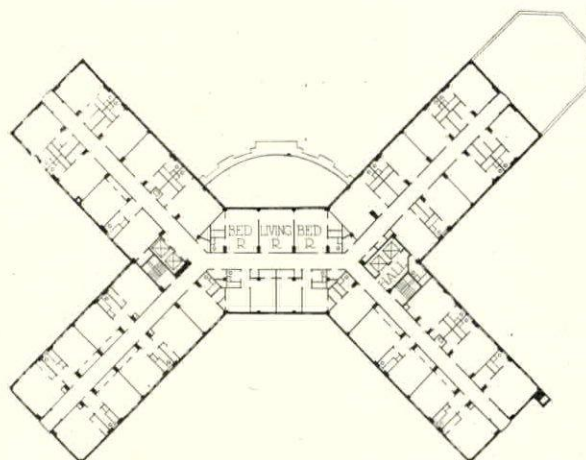
<b>Boiler Plant and Accessories</b>		
All cast iron boilers.....	30-50	years
Steel boilers.....	25-40	"
<b>Steam Heating Systems</b>		
All cast iron radiators.....	25-40	"
Steel or wrought iron pipes for steam lines..	20-40	"
" " " " " return " ..	10-30	"
Cast iron fittings on steam lines.....	50-75	"
" " " " " return " ..	20-50	"
Cast iron valves on steam lines.....	50-75	"
" " " " " return " ..	20-50	"
Brass valves on steam lines.....	50-75	"
" " " " " return " ..	30-50	"
<b>Hot Water Heating Systems</b>		
All materials.....	50-100	"
(Cases on record where pipes of 65 years' service were as good as new.)		
<b>Indirect Heating and Ventilating</b>		
Galvanized iron ducts and flues and fans in dry places, well covered and carrying dry air	100	"
Ditto in moist places carrying moist air inside, not covered subject to condensation and corrosion .....	5-25	"
Copper and nickel alloy flues, not subject to chemical reactions.....	100	"
Ditto subject to chemical reaction.....	5-25	"

Experience proves that whenever moist air must be conveyed, and where such ducts and flues are located in cold spaces, which would set up condensation on the inside, the ducts must be well covered to avoid condensation on inside, and with it corrosion. Similarly, where cold air is conveyed in ducts running through moist places, the ducts must be well covered to prevent outside condensation.



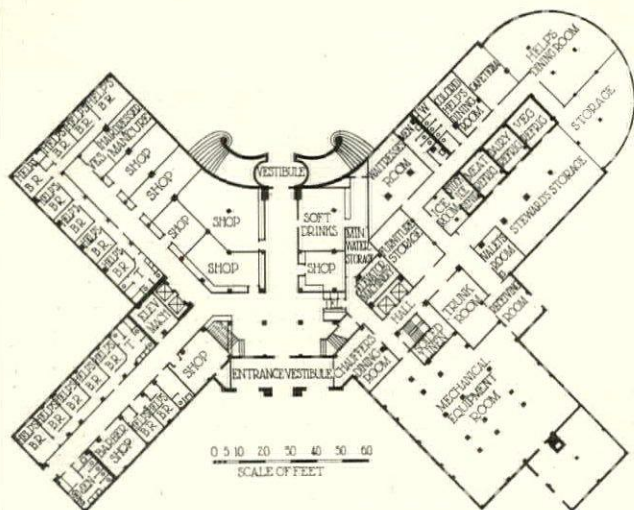


*THIS* is a resort hotel, now under construction at Miami. It has 200 guest rooms with 140 baths. This is the maximum number of rooms that the management considers convenient to provide with a particular, personal service. The dining room seats 750 and caters to a large outside patronage. The only other public room is the lounge, which will accommodate 300 when used for social

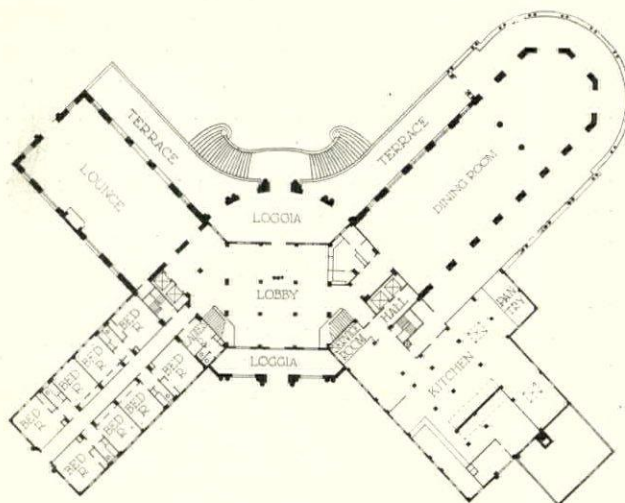


Typical Floor Plan

functions. The construction is of reinforced concrete throughout, with stucco and cast cement exterior. A two-pipe steam system supplies heat to the principal rooms, and aside from a 7-ton refrigerating plant there is no other mechanical equipment. The plan is of particular interest in that all features of the hotel have been provided above ground with several shops opening onto an arcade.



Ground Floor Plan



First Floor Plan

NAUTILUS HOTEL, MIAMI, FLA.  
SCHULTZE & WEAVER, ARCHITECTS



# Sanitation and Water Supply in the Modern Hotel

By CLYDE R. PLACE

*Consulting Engineer on the Mechanical Equipment of the Biltmore Hotels*

THE modern hotel building is a complete world by itself, in that as soon as a guest enters the front door he must be accommodated and pleased in every way with the personal and mechanical resources the management has assembled, and in leaving he must feel satisfaction with his visit and anticipate the time when he can return. In order to insure this contentedness of the guest it is absolutely necessary that the hotel have every up-to-date mechanical appliance and arrangement, so that perfection of service can be realized.

The modern hotel has to accommodate and operate successfully various mechanical systems, consisting principally of heating, ventilating, plumbing, electrical devices, elevator, refrigeration and ice making, boiler plant and generator plant, laundries and pneumatic tubes. The up-to-date hotel is a complete unit, where food and supplies come in at one door when the guest comes in at the other, and the personnel and appliances of the hotel are organized to bring them together in perfect service; it may be likened to a modern manufacturing plant in which the product is not material, but service.

The water and sanitary systems in the modern hotel are very important features which must be carefully considered by design, and thought out in every detail. When the guest goes to the lavatory in his bathroom and turns on the hot water faucet, he wants hot water immediately, regardless of whether the room is on the first or the 20th guest room floor. To accomplish this means that in the basement of the building there must be ample hot water heaters to heat the water by means of exhaust steam from generators or low-pressure live steam from the boiler plant, and in addition it is often necessary to circulate this hot water by pumps throughout the building to give quick circulation in the piping and thus produce the desired results at the hot water faucets. In addition to the large hot water heaters for the guests, it is necessary to have separate large heaters for the kitchens and laundries for economical reasons, and due to the fact that the temperature of the water for the laundries and kitchens has to be higher than is needed for the guests. For such a system of hot water it is customary to use brass piping, for it has been found by experience that steel or wrought iron piping galvanized will give out in a few years' time under this service of variable kinds of water. In certain sections of the United States the hardness of the water demands that it be artificially softened so that it will lather freely, and so that the guest in washing or bathing will not be subjected to the uncomfortable feeling of roughness on his hands and body which often results by use of hard water. Fur-

thermore, hard water will impair the efficiency of the laundry and will cause corrosion of the piping system, due to greater action of chemical components in the water when it is hot.

A filtering equipment of ample capacity to permit of slow filtration is essential in nearly all hotel installations. This equipment takes the raw street water and removes many impurities before it goes into the softening apparatus or suction tanks.

Water softening requires a complete working apparatus, consisting of a complement of tanks, piping and pumps and the like, located in the basement, into which the water is drawn and acted upon by salts and chemicals. After the water has been treated in this equipment it goes to a large surge tank, and in turn it is pumped to the top of the building, where there are several storage tanks, the elevations of which are sufficient to provide ample pressure to operate all of the plumbing fixtures throughout the building. Often the direct street pressure is sufficient to operate the fixtures on the lower floors, thus saving the cost of pumping the water for this section of the building. In case the height of the hotel is such as to make the pressure from the roof tanks too great in the lower portion, intermediate tanks are often introduced in the building, or else reducing valves are installed so that the water as it comes to the various plumbing fixtures throughout the building has about the same pressure. The water from the roof tanks also enters the hot water system as make-up water by way of the hot water heaters in the basement.

The cold water piping is generally either of mild steel or wrought iron, thoroughly galvanized; malleable iron fittings are used on the smaller sizes of piping and galvanized cast iron fittings on the larger sizes.

Differences of opinion exist as to the relative merits of various piping materials; it is impossible to lay down arbitrary rules for selection, because of the effect of local conditions; the chemical composition of water in different localities varies greatly, and a choice of piping can safely be made only after a chemical analysis and consideration of the reaction of the water on the pipe, or more often by local engineering experience. The cost of replacement is prohibitive in its disruption of service and in money; extreme care should therefore be exercised to see that the piping system is so specified and designed that it will endure throughout the normal, effective life of the building.

The valves in the plumbing system should be of standard manufacture, easy of duplication and adapted for endurable service, brass bodied up to 2 inches, and above that iron bodied. The larger



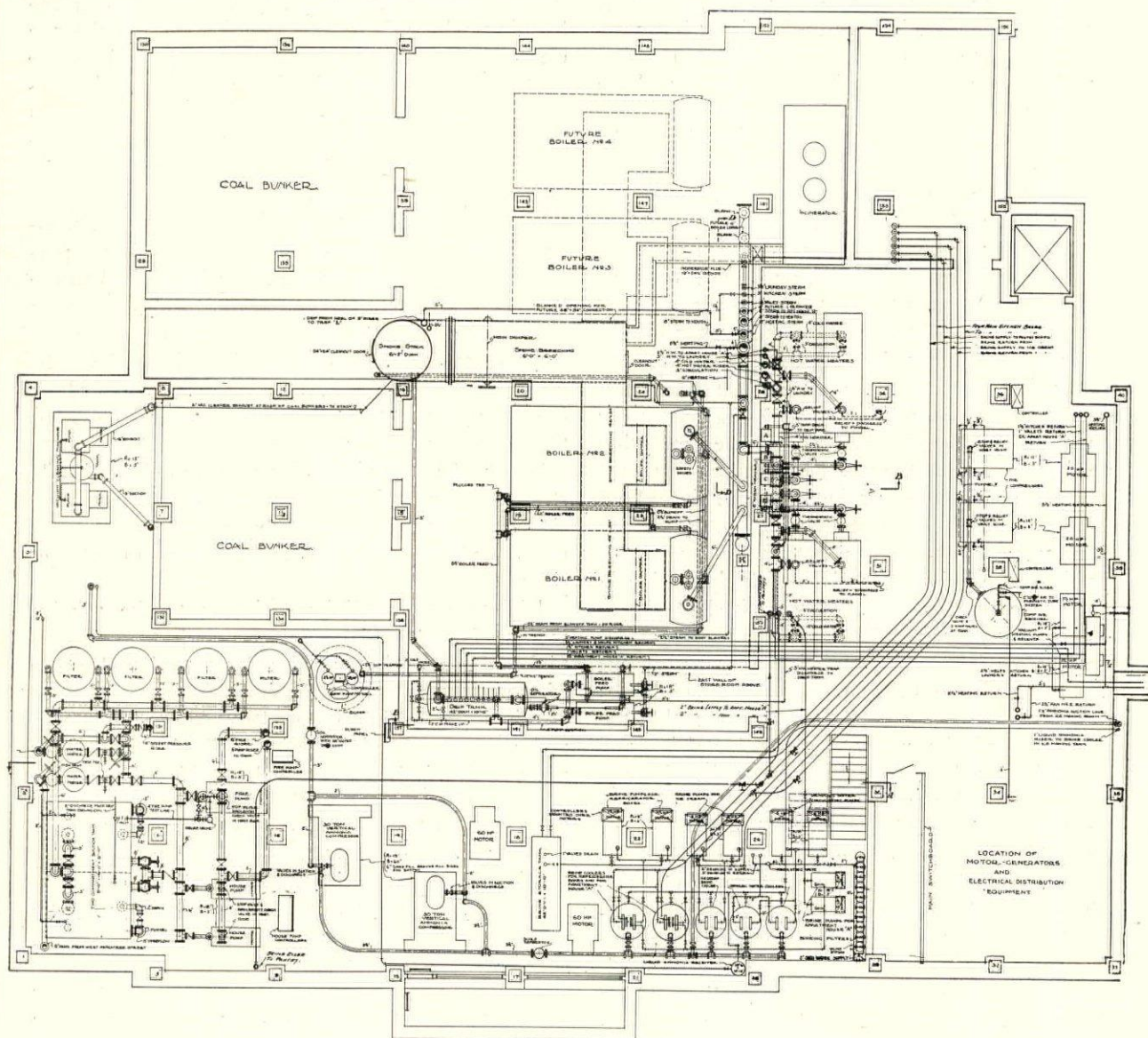
valves, such as those of 4 inches and above, should have riser stems to enable the observer to see at a glance whether the valve is open or shut. For cold water, generally globe valves are used for the smaller sized piping—2 inches and below—in order to obtain a throttle effect, and gate valves are used for all sizes above. For hot water under circulation, gate valves are used generally, because a globe valve allows a trap in the circulation, and globe valves are only used on short branches to fixtures.

One of the most important and vital features in the operation of an hotel is the elimination of all noise from whatever source, because many guests will complain even if in the bedrooms there is an automatic clock which every minute makes a slight noise. In order to eliminate noise as much as possible in the plumbing system of the building, it is necessary to provide ample air chambers at the plumbing fixtures so that water hammer will be avoided when the valve is closed suddenly. The air chamber acts as a cushion and permits the shock

from a sudden stoppage of the valve to be absorbed.

The waste and soil piping system in the modern hotel is generally of galvanized wrought iron or steel piping with malleable and cast iron or galvanized iron fittings. In some sections of the country, and where a hotel of not too great height is to be constructed, and when every economy is necessary, extra heavy cast iron pipe and fittings are used for the soils, wastes and vents. The greater amount of the waste from the plumbing fixtures throughout the building can be taken directly into the street sewer, but as the lower portions of the hotel are often below the level of the sewer it is necessary to have electrically operated sump pumps or sewage ejectors for raising the waste to the sewer level.

It is customary in modern hotel construction to have the bathrooms so connected with the bedrooms and so located that they will be grouped in pairs about a common vent and pipe shaft and in a direct vertical line through the height of the building. This



Floor Plan of Machinery Section of Basement, Atlanta-Biltmore Hotel, Atlanta  
Clyde R. Place, Consulting Engineer



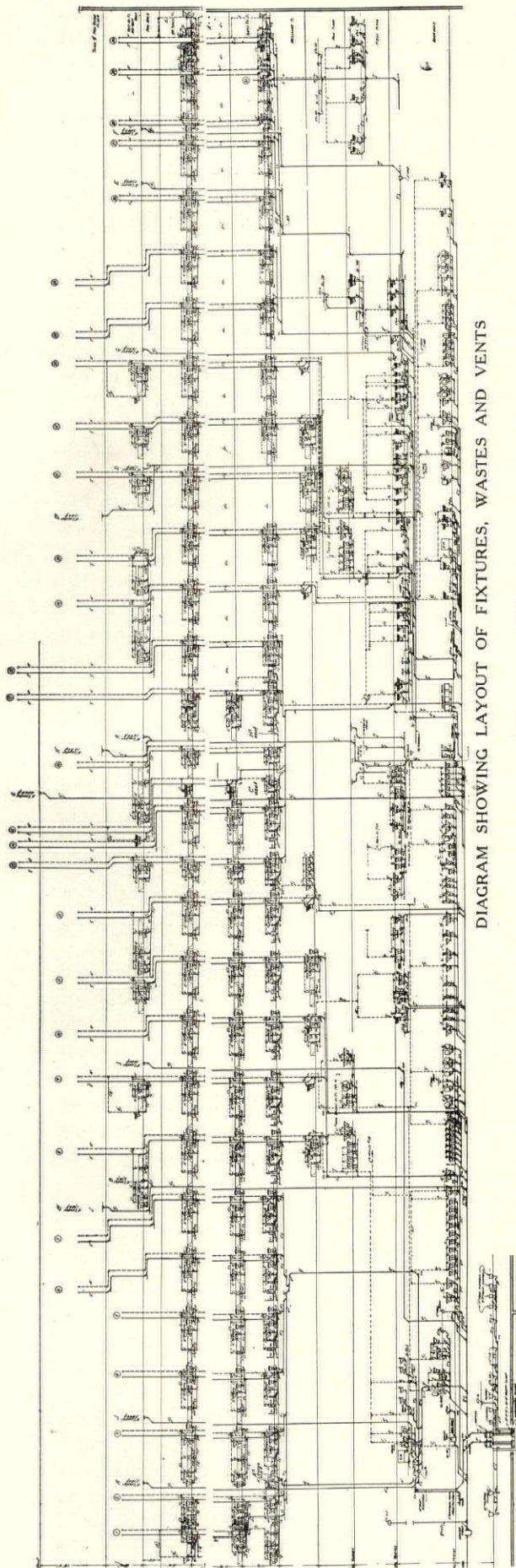


DIAGRAM SHOWING LAYOUT OF FIXTURES, WASTES AND VENTS

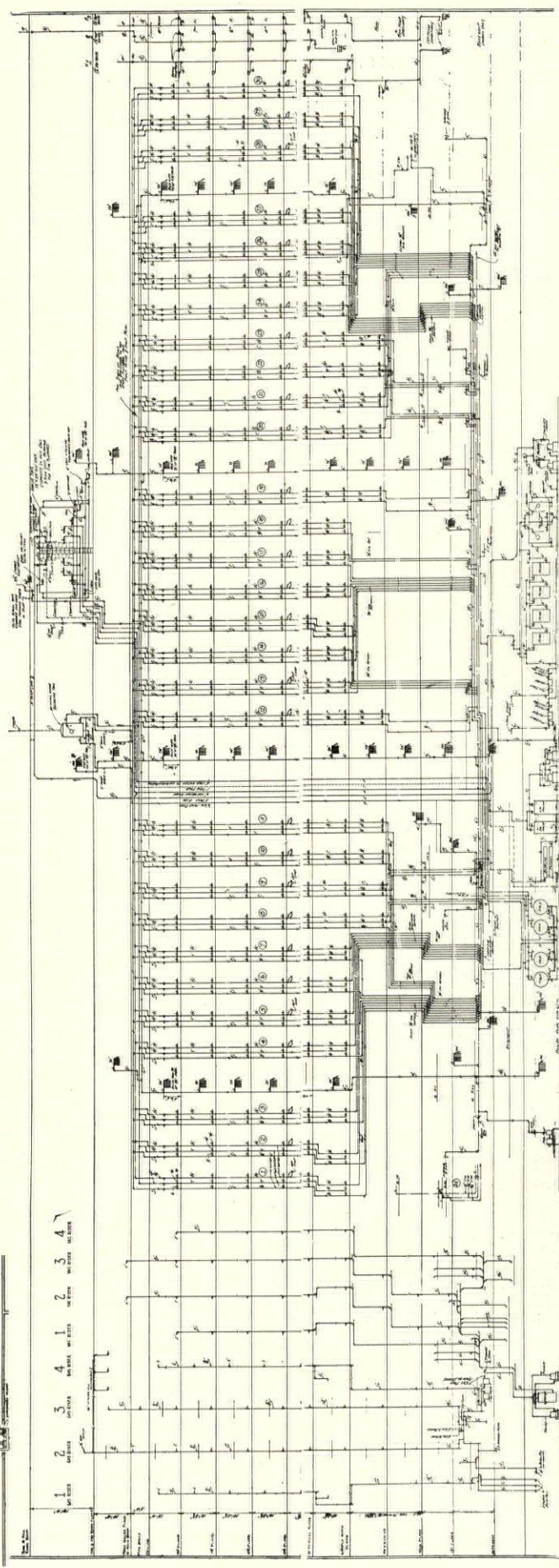


DIAGRAM SHOWING RISERS OF WATER SYSTEM AND MACHINERY IN THE BASEMENT  
ATLANTA-BILTMORE HOTEL, ATLANTA



permits one common soil pipe through the building to be used for two bathrooms on each floor. This common system of piping likewise applies to the water supply lines—hot and cold, and iced drinking water.

All the various waste and soil lines coming down through the shafts scattered about the building are collected in the basement; it is difficult to collect them on any intermediate floor because of the lack of necessary space to give the required fall in horizontal lines and because of the always present danger from accident of leaks which would destroy expensive decorations of the public rooms.

Each waste or soil line should have a vent connected to the line just below the lowest trap and run in a plumb line to and above the roof. Each fixture with connection into the waste line should have a branch vent from its trap. These vent lines operate on the natural pull of the outer air; there is no need for artificial exhaust, though the bathroom shafts in which they occur are ventilated by exhaust fans on the roof. In hotel plumbing no attempt should be made to economize through eliminating recognized efficient principles of plumbing, even though local ordinances may permit. The same thought applies to the selection of fixtures and fittings throughout the hotel; quality appointments only should be considered; the initial cost is soon forgotten in satisfaction of service and freedom from constant maintenance expense.

In fitting shower baths, separate hot and cold water valves will meet the satisfaction of the great majority of guests. The experience of changing temperature of water after a satisfactory mixture has been obtained is due to improperly proportioned piping; even service can only be assured when tanks and piping of ample capacity are installed, so that sudden calls on the circulating system will not affect the free flow of both hot and cold water. All toilets throughout the building should be equipped with flushing valves; the use of tanks has been abandoned in all first class installations. The silent operation of toilets is most important, and this result is assured by the use of properly equipped flushing valves. The bowls should be of the syphoning type to further insure quiet operation.

The fire protection system throughout the building must be a complete and independently operating unit. This is now required by fire and insurance regulations in practically all cities. In the larger type hotel automatic filling house pumps and a hand-controlled fire pump are installed in the basement which pump directly into the roof tanks and piping system, and in turn serve the different hose connections in the building. On the roof there is a reserve of water, normally around 3,500 or 4,000 gallons, to supply water to the hose until the fire pump is started. At every stairway there is a standpipe, and on every floor there is a hose rack with a line of hose between 75 and 100 feet long. Through the lower floors of the building and in the service

quarters this hose apparatus is distributed, and so located that there is no area but that can be reached by the water from the nozzle.

In case of fire, the first operation is to run to the nearest hose, which is usually designated by a red light, and open the valve; in view of the water storage on the roof and that in the standpipe system, there is sufficient water to respond immediately on the opening of the hose valve. With the operation of opening the hose valve the fire pump in the basement will have been started by means of the house fire alarm system, and this pump is usually of sufficient capacity to feed at the maximum pressure from 4 to 6 hose equipments, which is more than ample to take care of any normal fire in the building. In case it is seen that the fire is too large and dangerous to be handled by the hotel fire department, a silent alarm is sent to the city fire headquarters. The city department takes the water from the large street mains and pumps it into the interior mains through the siamese fire connections on the outside of the building which are connected with the standpipe system, and at which time the hotel fire pump stops operating. In some hotels it is necessary, because of insurance requirements, to put an automatic sprinkler system in the storage quarters below the street level. This installation is supplied from a roof tank or street pressure, and differs in no respect from the usual sprinkler arrangement. The house pumps generally are of the multi-stage centrifugal type, directly connected to electric motor. All are located in the basement and so cross-connected that either one or both may be operated on the automatic roof tank float switch system. The motors can be either of alternating or direct current type, depending upon the kind of electrical energy available.

All hot water plumbing lines should be insulated with a non-conductive heat covering, generally of magnesia, but sometimes of asbestos air cell. Cold water pipes are also protected by an anti-sweat covering in order to prevent condensation and dripping on the finished portions of the building. Where this piping occurs in exposed finished places, the covering is recanvassed, neatly sewed and painted to give a good appearance.

All piping lines must be adequately supported. Hangers are generally of what is called "blacksmith wrought construction." In horizontal piping the hangers are usually placed at distances of 10 or 15 feet apart, in accordance with the size of the pipe and what it carries. They should be firmly fastened, either to the steel or through the floor above. Vertical lines have horizontal hangers of "blacksmith wrought construction," with extended arms supported on or clamped to the beams of the building structure. Where piping is subject to expansion, such as hot water and steam lines, heavy expansion bends or loops must be installed, and between these bends the piping must be anchored so that it will travel from the anchor to the bends.



# Elevators in Hotels

By BASSETT JONES

*of Meyer, Strong & Jones, Inc., Consulting Engineers, New York*

**A**S in high class office buildings, so in high class hotels, the tenant more and more expects and demands rapid elevator transportation. This, coupled with the increasing number of floors to be served and the consequent longer hoists, makes the elevator problem one of great importance.

The first step in determining elevator equipment for any given case is to establish the rate of traffic flow or the number of persons that must be moved by the elevators in a given time, together with the direction and distance over which they must be moved. Next the character of service must be established. The latter depends on three things: First, the length of time that a passenger can be expected to wait for a car, which determines the interval between cars. Second, the length of time a passenger can be expected to remain in a car, which determines the round-trip time of the cars. Third, the smoothness of motion of the cars which either determines the maximum velocity at which the cars can travel, or the special equipment that must be used to attain smooth motion and easy starts and stops with high velocity. Obviously, the higher the velocity and the less the time consumed in starting and stopping the car the shorter the round-trip time will be. For hotel service where the traffic is heavy, the stops frequent, and the hoists long, the use of the modern direct-drive traction elevator is advisable. Such elevators operate better, control better, are safer and decidedly more economical than the hydraulic elevator.

If the average round-trip time and the interval are known, the number of cars required to maintain the schedule desired is obtained by dividing the interval into the round-trip time. Of the round-trip time, 50 per cent or more is "standing time," which includes time consumed in opening gates and doors, time consumed in taking on and discharging passengers, and time consumed in false stops when the operator fails to make accurate landings. The number of false stops increases as the velocity of the elevators increases. The standing time, and, with it, the round-trip time, can be reduced by the use of adequate signaling devices and by the use of power-operated gates and doors. In any case only the best gate and door equipment should be used. False stops may be practically eliminated by the use of auto-levelers. Furthermore, auto-levelers add greatly to the quality of service and to the sense of security on the part of the passengers.

In large, busy hotels it is essential to put the guest cars under the supervision of a dispatcher who is kept informed by proper devices not only of the position and direction of motion of every car, but also of the location of waiting passengers, and as to whether or not their signals have been

properly answered. The satisfaction of the guests with the elevator service is largely dependent on the starter or dispatcher.

It may be that the time saved by these several means will amount to an interval, in which case either the same traffic can be handled by one less elevator, or the traffic capacity of a given number of elevators can be correspondingly increased. In high class hotels, an interval of 30 seconds is usually considered satisfactory. This means that during the period of heaviest traffic, on the average, a car in each bank must leave the main floor every 30 seconds.

The determination of the proper number of elevators and their equipment for any case requires the consideration of so many factors that no definite recommendations can be given. The size of the cars depends entirely on the number of passengers they must carry. Thus, suppose that in a 30-second interval 12 passengers will wish to leave the lobby floor; then at least a car capable of carrying easily 12 passengers should be used if crowding is to be avoided. In hotels hand baggage is frequently carried in the passenger cars, and additional space must be provided for it.

Wherever possible one should avoid running the guest elevators below the main or lobby floor, unless the service to such lower floors requires that every car stop at these floors on every trip. Otherwise the schedule will be constantly thrown out of balance and the service slowed down. It may be advisable to extend one car in each bank for emergency service—lame or sick guests. But such trips should be made only at the discretion of the starter or dispatcher. If there is a considerable demand for elevator service below the lobby floor it may be more economical to provide separate low-rise elevators to take care of it. The same is sometimes true of elevator service to a ball room. It may pay to provide low-rise ball room elevators, which may also serve other public floors not directly involved with the room guests. As far as possible, keep the general public and guests not occupying rooms out of the high-rise elevators serving the guest rooms.

Unlike office buildings, hotels have two entirely distinct classes of traffic—one for guests, and one for service, that must be handled by two entirely separate groups of elevators. The number and class of the service elevators are determined in the same manner as for the guest traffic, allowances being made for the differences in the two classes of traffic. If the room service is heavy and is handled from a centralized room service kitchen and pantry, the service elevator traffic will be correspondingly heavy. Indeed it may exceed the guest traffic. If

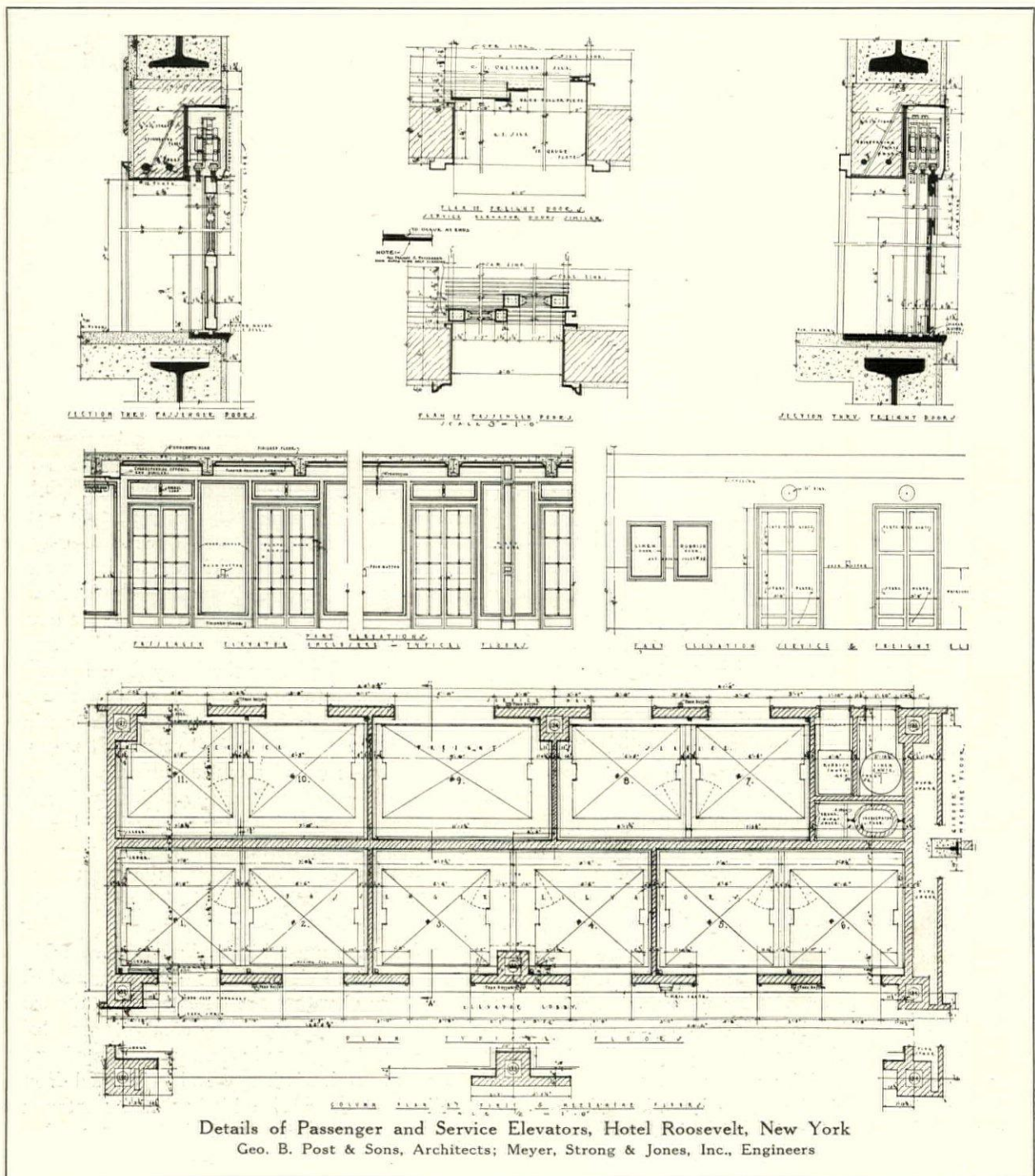


the service is to be prompt, obviously the service elevators must leave at frequent intervals. At the present time the tendency is to use service elevators of nearly the same, if not the same, number as the guest elevators and of the same operating characteristics and duty. There is a decided tendency toward increasing the number of service cars and eliminating dumbwaiters. It is probable that in very large hotels the room service can be speeded up by putting the service cars under the supervision of a dispatcher, precisely as is done with the guest cars.

In hotels all guest and service elevators should be furnished with car gates, the use of which should be compulsory, and all such elevators should have

adequate car gate landing door interlocks. Over 80 per cent of elevator accidents are due to careless landing door operation.

For the low-rise elevators, baggage hoists, kitchen elevators, etc., in the basements, the rise, of which is short and the service more or less infrequent, the hydraulic plunger type is often useful and economical. Such elevators may be operated from the house tank, the waste being discharged into the sewer. If the house tank pressure is not sufficient or the service is heavy, or if the cylinders must be drilled in rock, the electric elevator may prove to be the most economical. If possible, "sidewalk lifts" should be avoided as they have caused many accidents.





# Special Hotel Equipment

By ALVIN D. McLEAN

*Supervising Engineer, United Hotels Company of America*

THE hotel is a business institution organized to sell service to the public and return a profit to its stockholders. Equipment plays an important part in the operation of a hotel, and it requires careful and detailed study to determine the amount required and then to select the type that will most closely fit the needs of the hotel. Excessive equipment is a worse handicap if anything than too limited equipment, as it constitutes a steady drain on overhead expenses that the most careful supervision cannot overcome. The quality of equipment is another important consideration; cheap materials will inevitably involve high maintenance costs, and since satisfactory operation is so greatly dependent on service equipment, it is essential that only devices of recognized merit be permitted to enter a hotel.

Vacuum cleaning apparatus is essential equipment in all but the very smallest hotels. The system generally adopted includes an electrically-operated stationary plant, with machinery and motor selected to fit the exact requirements. The average sized plant operates on a 7½-h.p. motor; in selecting the motor it is important to bear in mind that it will operate more economically at 75 to 100 per cent capacity

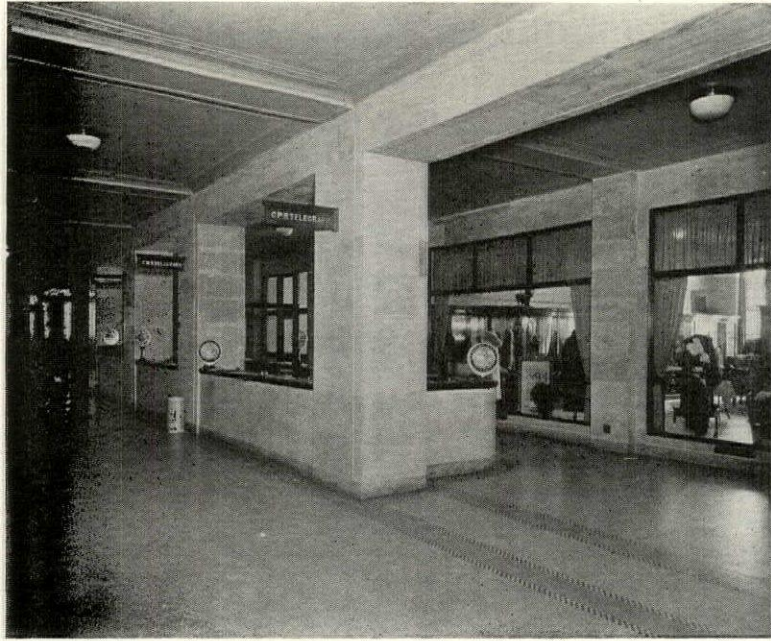
than it will at 25 to 50 per cent; it is better therefore to select a small motor and to arrange the cleaning schedule to keep it up to capacity when working. The machinery is installed in the basement with piped connections to the various floors. The accumulated dust and dirt are loaded into barrels from the machine and taken out with the ashes. If the hotel is equipped with an incinerator, the vacuum machinery should be located in proximity to it. Hose lengths of 50 feet are as large as can be conveniently handled for cleaning, and the outlets should be spaced along the corridor walls so that this length will reach all parts of the corridors and extend into the rooms without frequent changes of outlets or an excessive number. The vertical runs of piping can be accommodated in the bathroom vent and pipe shafts.

It is not necessary to provide a reserve unit because in the average city the necessary repair parts can be quickly secured, and portable electric machines will provide sufficient service during an emergency. From a point of convenience in operation it is always well to provide portable apparatus in addition to the stationary plant; there are occasional small rooms that are inaccessible from the



Scales in the Steward's General Stores, Pennsylvania Hotel, New York  
McKim, Mead & White, Architects





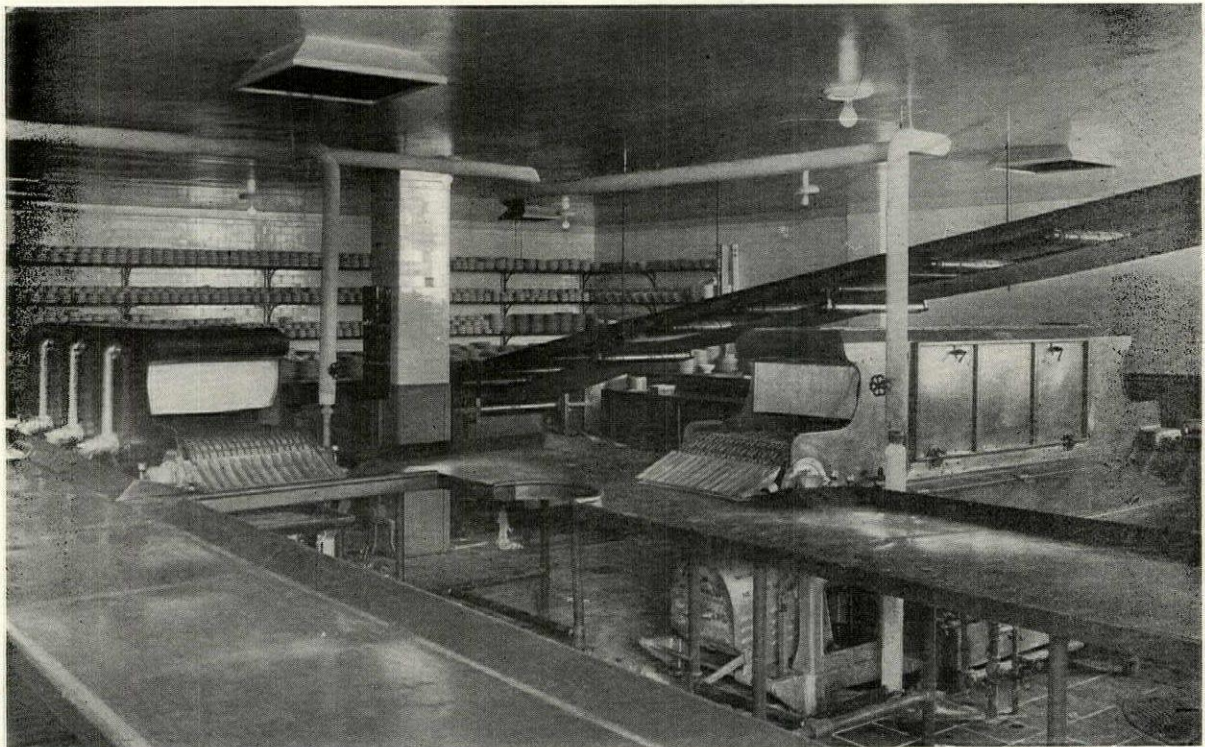
Corridor of the Mount Royal Hotel, Montreal, showing telegraph counters and illuminated signs  
Ross & Macdonald, Architects

main corridor without excessive lengths of hose and frequently special cleaning is required; in these events portable apparatus is useful. The public rooms and corridors are completely served by the stationary plant, and the cleaning of these portions each day is done in a comparatively short time, after which the plant is shut down. The various rooms require attention as guests depart, and the maid on

the floor can attend to this with a portable machine when it would not be convenient or economical to start the stationary plant.

The successful operation of any hotel requires quick and easy communication between the guest and the various service departments and between the departments themselves. The perfection of electrically-operated duplicating writing devices has greatly increased the efficiency of hotel service in this respect. Requests of guests for service are received by telephone and relayed by means of electrical connections in written order form to the particular department concerned; departures of guests are similarly announced to the housekeeper and the office, and when the room is in readiness for a new guest this fact is likewise properly recorded. Each of the various departments through the hotel should be equipped with receiving appa-

ratus, and those at which orders originate with sending apparatus also. In hotels that have floor clerks the machines are located at the floor desks; in other cases it is in the maids' floor closet with a light signal over the door to call the maid's attention to the order, and a signal at the housekeeper's or other corresponding sending station to indicate that the message has been received. At one of the



Dish Washing Department and dish conveyers in Los Angeles-Biltmore Hotel  
Schultze & Weaver, Architects



stations, usually the front office or the telephone switchboard room, the master machine is installed, where a permanent record of every message transmitted is kept.

In a large installation it has been customary to combine the main sending station directly with the telephone switchboard, but it has been found that this retards the handling of outside calls and that a better arrangement is a separate switchboard for the house messages, connected with a special circuit to the telephone switchboard, so that the telephone operators can switch to the message desk such calls as require orders. This method also has the advantage of saving time in the installation and reducing expense, because the combined switchboards are built specially and the rental charge is high.

There are two types of message systems; one duplicates hand writing and is recorded on a continuous sheet of paper about 5 inches wide; the other records in typewriter form, and the message runs along a tape. The machines of the first system are supplied on a rental basis and must be operated on direct current; the machines of the other kind are purchased outright and can be operated on either kind of current. They each operate on current of 110 volts, and it is important that nothing else be placed on the same circuit, because the operation is delicate and any slight interference will cause trouble. When alternating current only is available and the first system is adopted, an individual motor generator set for transforming the current should be used.

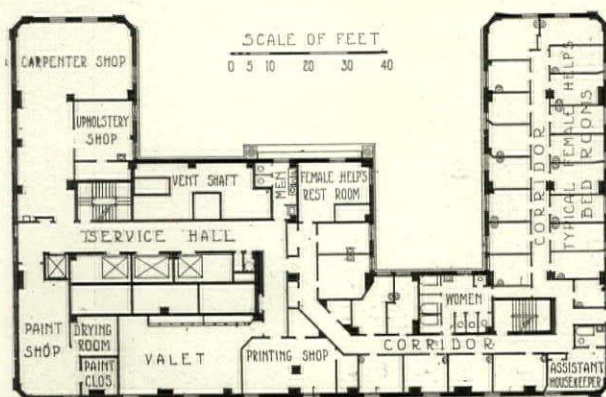
In the larger hotels, where a system of floor desks working in conjunction with the main office desk is adopted, it is usual to install also a pneumatic carrier system. This is used for the dispatch of mail, telegrams, keys, etc., and in the large hotel reduces the number of pages and bell boys and eliminates considerable elevator traffic. The system is operated by compressed air, and due to its intermittent service the noise from the machinery is noticeable, and the compressor equipment should be located in the basement distant from any public rooms, but in easy relation to other machinery for the convenience

of the engineer's staff. The incorporation of a pneumatic carrier service should be anticipated in the design of the building, so that proper shaft space with the straightest runs possible can be provided.

Other electrical equipment that must be considered in the development of plans for a hotel are fire alarm systems, watchman's and master clock systems, and telephone and telegraph service. The engineering and installation work for the latter services are supplied by the respective local companies, and sufficient notice must be allowed them for the preparation of wiring layouts so that the installation will conform to the building layout and proceed with the construction. In any extensive telephone service a special room for the operators' switchboard will be required; this is frequently arranged on the service floor or in the portion of the mezzanine floor given over to the hotel business offices.

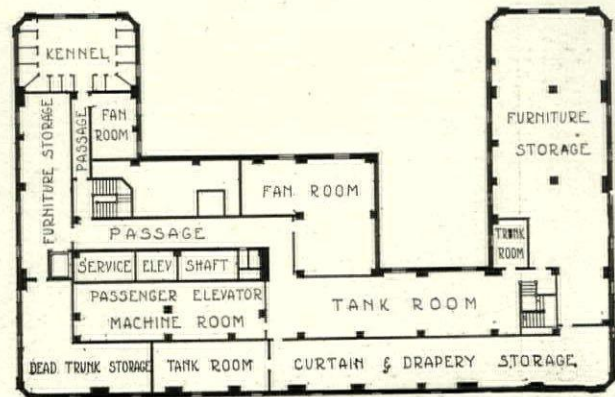
The watchman's clock system may be arranged in three ways: a portable clock with no electrical connections, which is of course the least expensive; an interior electrical system, and an outside electrical central station service. With the portable system, the watchman carries the clock and records his rounds with the key attached to each station. This system does not provide any supervision of the watchman except in the morning when the records of his clock are examined. The interior electrical system provides the recording of the watchman's calls at any designated point where supervision can be maintained. A practical arrangement when an absolute check-up is desired is the installation of an interior system with an outside station at the beginning and end of each route; the systems are wholly independent of each other, and failure to call the station will bring immediate notification from the outside service company. Such a system reduces the insurance rate, and it is worth having.

Fire alarm systems are similarly of two kinds,—interior and outside service. It is doubtful if the outside service is advantageous for a hotel; its cost is not covered by the resulting saving in insurance, and it always presents the possibility of an accidental alarm by an intoxicated person or a stupid and



Service and Dormitory Floor Plan

Shops grouped for efficiency and supervision; location on eighteenth floor insures light



Pent House Roof Plan

Note accessibility and space requirements for elevator machinery, fans and house tanks

Roosevelt Hotel, New York



excited employe, with the result that the arrival of apparatus frightens the guests without cause. A first class interior electrical system that will automatically indicate to the office and engine-room where a fire is, meets all the requirements.

Every hotel of any magnitude should have a well designed electric clock system. The master clock makes contact on relay, and the relays should be installed in duplicate to prevent breaks in the service. An excellent plan is to install also a cheap master clock for emergency use. The current for the clock system and the electrical alarm systems should preferably be from storage or primary batteries, unless a good source of outside current can be depended upon. The minimum voltage for this low-tension system should be 20 volts; this will also operate watchman's clocks, time stamps, push-buttons and similar devices. It is important that this system be installed with as much care as the lighting system; all wires should be run in conduits and the same grade of materials used as for the high-voltage system.

In the hotel of 500 rooms and more there is a constant problem of maintenance and repair work. With proper working space and equipment much money and time can be saved the management by having everything possible done within the building. The carpenter, machine, electrical and upholstery shops, particularly, should be given careful attention to see that adequate space is provided and that an equipment of standard machines capable of doing varied work is installed. The upholstery department is frequently placed at the top of the building to benefit by better light conditions; its location should be determined so that furniture and mattresses may

be brought to it and back from the various floors with the least demands on the freight elevators. The other workrooms are best grouped together, either in the basement or on a service floor for easy control. In connection with the engineer's department in the basement there should be planned adequate storerooms for steam fitting, electrical, engine-room and boiler supplies.

Suitable provisions should be made for checking and weighing raw material that comes to the hotel. In the Mount Royal in Montreal, the most recently completed building of the United Hotels Company, a 20-ton auto truck scale is installed just outside the service entrance for weighing coal and other supplies delivered in large quantities, and a 2,000-pound indicator dial scale for weighing smaller quantities is located in the steward's general storeroom.

As a general convenience and aid to the engineering staff charged with the operation of the mechanical equipment a practical working scheme for identifying the various lines of piping in the shafts should be devised. This is perhaps most easily accomplished by color markings; different colors should be used to indicate hot and cold water lines, high-pressure and exhaust or low-pressure steam. In addition, the contractor installing the plumbing and heating plants should attach to each valve a tag with a number and statement of what it controls. A valve chart should then be prepared for the engineer's office, indicating by numbers the various valves, their locations and what they control. This procedure will greatly facilitate the location of trouble. The employment during the construction stages of the chief engineer is an insurance of careful and smooth operation to the management.



Olympic Hotel, Seattle, a 600-Guest Building Now Under Construction for the United Hotels Co. of America  
Geo. B. Post & Sons, Architects